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REPORT ON ECONOMI PLANNING IN THE UNITED PROVINCES

1937

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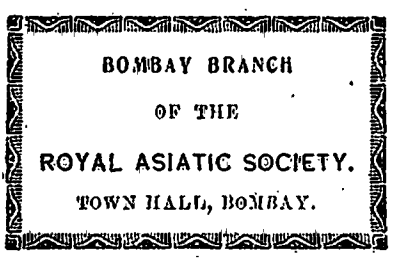

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REPORT

ON

Economic Planning in the United Provinces

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ALLAHABAD:
SUPERINTENDENT, PRINTING AND STATIONERY, UNITED PROVINCES, INDIA
1937

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CHAPTER I

INTRODUCTION

On the 8th December, 1933, the Leader of the Opposition, Mr. C. Y. Chintamani, M.L.C., moved a resolution in the Legislative Council of the United Provinces which ran as follows:

"That this Council recommends to the Government to set up a committee to draw up a five years' plan of economic development for these provinces, with instructions to report also on the financial measures necessary to give effect to their recommendations."

This resolution was adopted by the Legislative Council and the Hon'ble Minister for Education and Agriculture stated on the floor of the Legislative Council that the United Provinces have already got an expert standing body in the Board of Economic Inquiry and the Bureau of Statistics and Economic Research for this kind of work. He regretted that on account of financial stringency the Board and the Bureau had not been able to function a great deal. He, however, promised to put these on a suitable basis and suggested that the question of drawing up a plan of economic development for the provinces might be entrusted to the Board of Economic Inquiry which may be expected to deal with the matter systematically and methodically. At the meeting of the Board on the 19th July, 1934, the Hon'ble Minister placed this matter for the Board's consideration. After a detailed discussion on the meaning of a development plan and the limited powers of the Provincial Governments under the present constitution to carry it through, it was decided to refer the Council Resolution to a committee of the Board consisting of the following members:

(1) Khan Bahadur Maulvi Muhammad Obaidur Rahman Khan, M.L.C., Aligarh (Chairman).

(2) Mr. F. R. Randall, the Agent, Allahabad Bank, Ltd., Lucknow.

(3) Dr. Radhakamal Mukerjee, M.A., PH.D., Lucknow University, Lucknow.

(4) Dr. D. L. Dubey, M.A., PH.D., Meerut.

Dr. R. B. Gupta, M.A., PH.D., Statistician, was appointed Secretary to the Committee.

The services of Mr. Randall could not be spared by the Allahabad Bank and Dr. Dubey ceased to be a member of the

Board of Economic Inquiry and therefore of the Committee. In their places Mr. M. L. Gupta, M.A., B.COM., A.S.A.A., R.A., Incorporated Accountant, and Lala Hari Raj Swarup, M.A., LL.B., ex-member, Legislative Assembly, were elected members of the Committee.

The Committee first met at Lucknow from the 11th to 15th January, 1935, and prepared a questionnaire which was sent out.

The Committee then assembled at Agra on 8th April, 1935, and visited Dayalbagh and went to several villages of the Kiraoli Tahsil in the district. Several witnesses were also examined.

From the 23rd to the 29th April the Committee had its sittings at Partabgarh, Benares and Gorakhpur and examined witnesses. In the absence of the Chairman, Dr. Radha Kamal Mukerjee presided.

At Partabgarh the Committee inspected the work of rural reconstruction undertaken by the Agricultural, Co-operative and Public Health Departments. Cultivators, surpunches, and members of Co-operative Societies in these centres and in other villages were examined.

At Benares also the Committee made a tour in some villages where rural welfare work was in progress.

At Gorakhpur the Committee went to Kasia and saw the work of the Kasia Co-operative Marketing Board. Some villages and sugar factories were also visited with a view to examine on the spot the new problems in cane cultivation and industry.

The Committee also visited the tube-well area in Meerut and was taken round by Sir William Stampe to the tracts developed by the Irrigation Department in that circle.

The Committee reassembled at Cawnpore and Lucknow in April, 1936, and received oral evidence. Several Heads of Departments were examined at the Lucknow sitting.

A preliminary note on an outline plan of Economic Development of the Province was prepared by Dr. Radha Kamal Mukerjee, who also placed at the disposal of the Committee the results of several intensive surveys carried out by Post-Graduate students of the Lucknow University.

A large amount of evidence was received by the Committee and altogether about fifty witnesses were examined.

We are thankful especially to Sir William Stampe, Mr. P. M. Kharegat, Mr. J. L. Sathe, Mr. R. T. Shivdasani, Mr. J. H. Ritchie, Mr. C. S. Venkatachar, Mr. Vishnu Sahay, Rai Bahadur Chhuttan Lal, Dr. K. L. Chaudhri, Mr. E. O.

Shebbeare, Col. H. C. Buckley, Mr. R. C. Hobart, Mr. C. F. Wood, Mr. T. J. C. Acton, Sahebji Maharaj Sir Anand Swarup of Dayalbagh, Professor H. L. Puxley, and Mr. J. G. Ryan for giving valuable evidence and for offering various suggestions for economic development and improvement in rural areas.

We wish to express our gratitude also to Mr. R. G. Allen, ex-Director of Agriculture, United Provinces, Mr. J. M. Lobo Prabhu, Mr. R. H. Saloway, Mr. R. N. Dey and other officials and non-officials for sending us useful memoranda and notes.

Acknowledgments are also due to several Government departments for sending us memoranda on developmental plans and activities, which have been appended to the Report at the end.

Finally we record our thanks to our able and energetic Secretary, Dr. R. B. Gupta, for carrying out the work of the Committee, in addition to his normal official duties, to our entire satisfaction and for the arrangements he made for our tours.

CHAPTER II

Organization

1. Economic Planning is a delicate and difficult art. Its success depends not only on the concentration and co-ordination of the activities of reconstruction in the different fields which are interconnected and interactive on one another but also on the local initiative and progress-mindedness which such activities engender among the people.

2. That a planned programme succeeds better than piecemeal and isolated developmental activities has not, however, received as full recognition as one would have expected from past experience. No doubt improved agriculture depends on irrigation, while construction of wells by tenants or *zamindars* and large-scale expenditure on canal irrigation works by the State become remunerative only when these lead to improved agriculture. Co-operation similarly by affording facilities of credit and marketing offers better opportunities for investing more capital in the land and getting better value for the produce and thus leads to better agriculture; while the latter in its turn increases the agricultural surplus in the hands of the cultivator, promotes thrift and saving and leads to a quicker realization of both the economic and social aims of co-operation. More efficient and improved cattle lead to deeper tillage and make important food materials and other sources of income available to the cultivator's family, which accordingly realizes the benefits of good breeding and adequate feeding of cattle and can afford to purchase improved bulls and agricultural appliances. Finally, with improved health and living standards and with education there develops a new desire for progress, the will to live better, which supplies the much needed incentive for any scheme of uplift.

3. A planned programme also has other advantages. It lays down social and economic standards which give zest to the routine of administration. It eliminates the personal factor and makes possible the apportionment of praise and blame for officials while at the same time engendering a spirit of emulation among the people themselves.

4. As regards the areas of economic planning, two considerations are important: (*a*) To select areas where conditions of rural development have been stabilized. Circles of villages where irrigation from canals and tube-wells is available, where

co-operative societies and panchayats are efficient, where sugar factories or other industrial establishments are contributing towards improvement of farming and living standards, where single, compact *zamindaris* afford facilities of management or where hydro-electricity offers opportunities for rural industrialization will require less preliminary spade work. In such areas concentration and co-ordination are likely to create a change in the morale of the masses more quickly, (*b*) To select regions and areas where conditions of economic life are particularly unfavourable, where, for instance, agriculture is fighting a losing battle with desiccation and decline of sub-soil water level and with recurrent droughts, where rural industries have decayed, or where the spread of ravines and the increase of soil erosion have become a menace to agriculture and peaceful settlement.

5. In such areas the units of economic attack should, in our opinion, be a circle of twelve to fifteen villages with a resident organizer trained in rural reconstruction work. A local resident organizer will be able to tackle these villages for agricultural improvements and co-operative organization. As far as practicable the following sections of developmental activities should be concentrated in each circle :

(1) Improvement of agriculture.
(2) Consolidation of holdings and crop planning.
(3) Cattle improvement.
(4) Agricultural marketing.
(5) Irrigation development.
(6) Co-operative organization.
(7) Rural industrial employment.
(8) Improvement of roads and transport.
(9) Rural housing and sanitation.
(10) Removal of illiteracy.

6. It is necessary that the resident organizer should be trained in agriculture or in co-operative organization so that for the circle of 15 villages he might be in charge of field demonstration work in agriculture or the establishment of co-operative credit, better farming and other societies and the organization of cottage production.

7. While there should be a concentrated attack in the fields of agriculture, co-operation and cottage industries, other Government departmental activities will have to depend in each reconstruction centre on the officers on tour. It is the resident organizer in charge of a circle of 15 villages or less, according to the intensiveness of his work, who could best act as a

liaison between the villagers and all Government departmental staff. Agricultural assistants as well as supervisors of the Co-operative Department should plan their tour programmes in such manner that the rural reconstruction centres are regularly visited and seeds of organization planted gradually. We suggest that the resident organizer should pursue his programme for not more than 5 years in his circle and the programme thereafter be shifted to widening concentric circles of area in the same tahsil.

8. A period of 3 to 5 years appears on the whole adequate for the first intensive effort in each circle of 15 villages. In the meanwhile broadcast demonstration will be carried on at more or less distance from each rural reconstruction centre. Thus the programme of economic planning will be dual: one part being intensive planning in circles of 15 villages with a resident organizer in each and the other, broadcast propaganda in concentric circles with the headquarters of the resident organizer as their centre covering the largest number of villages possible.

9. For broadcast propaganda the links between the villagers and developmental activities of the Government will be represented by the village *panchayat* and by the *patwari* who might be given an honorarium for rural reconstruction work. The *panchayat* has been the traditional institution of village self-government. With the processes of centralization and disruption of village communal life, the *panchayat* has decayed and corporate solidarity has often given place to social and caste factions. With the *panchayat* revived by statute in every village, the essential implement of rural reconstruction will be made available to the masses. The *patwari* will not cost anything. He is a much maligned official but it must be conceded that he works with the quiet and smooth efficiency which characterizes an old institution like his. Nor, points out an important witness, is he liable to be overworked because the new Tenancy Act has reduced his attendance in court while the *chausala* system has reduced the work of records.

10. During a period of 5 years the resident organizer with the help of the development staff should be able to organize and stabilize a co-operative society, a seed store and a primary school in each village of his circle so that after the period of 5 years the village will be able to look after the agricultural, economic, sanitary and other improvement work without the direct help of any Government agency. That demonstration work of a broadcast kind undertaken through the agency of *patwaris* could prepare an area for a more intensive programme is shown by the

experience of rural uplift work in the district of Gorakhpur where Mr. Lobo Prabhu has been following a somewhat similar programme through the revenue staff. A continued series of demonstrations by *patwaris* will prepare, by the force of example, the mass of cultivators outside the circle of the intensive programme to better standards of farming and living. In a statement appended to this chapter the results of broadcast propaganda in the Gorakhpur Rural Uplift Scheme are tabulated.

11. Each rural reconstruction centre will, by effective example, prepare the surrounding villages in which the touring Governmental staff will be also working. With some 50 villages, each having its primary school, we may have a middle or a high school which will not only react powerfully on the removal of illiteracy but could utilize school teachers trained in rural reconstruction or boy scout troops for broadcast propaganda in agriculture and co-operation, for inculcating thrift and temperance and for other kinds of social uplift work.

12. Similarly with co-operative societies multiplying, a central co-operative bank and with seed stores multiplying, a Co-operative Marketing Board will inevitably emerge and these will maintain and develop standards of better farming, business and living. A model agricultural farm will similarly be set up as a centre of field demonstrations and agricultural propaganda, distribution of improved agricultural implements and machinery and breeding bulls for the area.

13. The organization of economic planning may be roughly envisaged as follows:

(i) A resident organizer in each circle of 15 villages and the village *panchayat* and *patwari* in the other villages undertaking the intensive and extensive programmes respectively.

(ii) A District Development Officer to supervise the intensive programme and co-ordinate the broadcast programmes of the various Government departments in the rural development centres.

(iii) The District Development Officer will be assisted by a whole-time Inspector and the touring staff of the departments of Agriculture (including Animal Husbandry, Agricultural Engineering and Marketing), Irrigation, Co-operation, Industries, Education, and Sanitation.

(iv) An Agricultural Engineer in every district for directing land reclamation and construction works, choice of suitable sites for well construction, prevention of soil erosion, water-logging, drainage, etc.

(v) A Forest Officer or an expert in fruit farming in every district for directing schemes of village afforestation, pasture and orchard management, reclamation of ravines, *usar* tracts and sand-dunes, and propagation of defensive vegetation against the encroachment of sand.

(vi) A Tahsil Committee composed of the resident organizers in each tahsil, representatives of the various developmental departments and the leading *zamindars* and *surpunches* in the tahsil, with one of the resident organizers as secretary and meeting at least once a month to consider and report on the plan of work.

(vii) Co-operative societies and *panchayats* in all villages acting as links between the villagers and resident organizers or touring staff of the development departments of Government.

(viii) Rural reconstruction-trained teachers in every school.

(ix) Domestic science-trained teachers in all girls' schools.

(x) A Lady Superintendent for home visits and women welfare work.

(xi) Rural guides and Boy Scout troops organized in close association with the Planning Department.

(xii) University students trained in rural reconstruction.

14. The District Development Officer will be an important link in the chain. He will be a Deputy Collector or Joint Magistrate selected from the ordinary staff of the district and will be assisted by the District Development Board similar in complexion to the Provincial Board of Economic Inquiry. The district Collector will be the *ex officio* Chairman of the Board and sub-divisional officers *ex officio* members. The Board should have on it the prominent *zamindars* of the district as well as tenants.

15. The present Board of Economic Inquiry, which we urge should be made a permanent institution under the designation of the United Provinces Board of Economic Inquiry and Development, should provide the District Development Boards with economic plans and serve as the clearing house for all ideas from the different districts and the central organization for the planning and co-ordination of the development work in the province.

16 One of the Ministers should be the President of the Board of Economic Inquiry and Development.

17. There should be a whole-time Rural Development Commissioner for the Province. He should preferably be of the grade of a Commissioner, interested in agriculture, co-operation and industries and his relations with the district officers would be of the nature of an adviser and superintendent of rural development work in the district. For the purpose of supervision and inspection he should be assisted by three assistant Rural Development Commissioners. He should be the Vice-President of the Provincial Board of Economic Inquiry and Development.

18. The District Development Officer will have under him the Inspector and the staff of resident organizers in the rural reconstruction circles. His extensive programme of demonstration and propaganda will be carried on mainly through the *panchayats, patwaris,* supervisors or co-operative banks, village guides or fieldmen of the seed-store department, as experience and local conditions would suggest. It is in consultation with him that the touring staff of all development departments should arrange their inspection and visits to the rural areas.

19. It is also the District Development Officer who will envisage the progress of the planned programme.

20. A plan should provide development for 5 years but the instalment of each year must be carefully defined and the achievement of each year, programme by programme, should become the basis of next year's effort. The instalment for each year will be envisaged in terms, for instance, of so many acres of improved wheat and sugarcane, of afforested land and controlled grazing, so many consolidated holdings and acres of consolidated cropping, so many better farming societies, tube-wells, pit latrines, schools, co-operative stores, health visits, improved agricultural implements and machines, approved bulls, etc.

21. From different circles of villages, tahsils and districts, there will be sent out to the Central Board of Economic Inquiry and Planning definite statements of economic and social progress, giving precise statistical information in different fields. Present-day statistics will serve as pointer readings and the planned programme, year by year, will furnish both the incentive and guidance of the co-ordinated drive. It will be the task of the Board of Economic Inquiry and Development to compare progress in the different districts, supply corrections where the movement has become slack, haphazard or spasmodic and direct the efforts of all concerned towards the social and economic standards clearly envisaged.

Statement showing the work taken under the Rural Uplift Scheme

Name of kanungo's circle	Number of patwaris who have complied with directions regarding line sowing of sugar cane	Number of patwaris who have complied with directions regarding manure			Number of patwaris who are complying with directions regarding line sowing of crops and preparation of manure							Number of patwaris who have expressed their inability to comply with directions with reasons	Number of Gujar ploughs purchased	Quantity of seeds indented (in maunds)		
		Compost manure	Urine earth making	Both sort of manure	Arhar	Maize	Early rice	Late rice	Compost manure	Urine earth making	Both sort of manure			Maize	Early rice	Late rice
Tahsils																
1. Deoria ..	26	161	86	67	94	80	98	103	35	104	110	..	88	36·5	50·10	45·25
2. Hata.. ..	145	191	118	138	163	52	194	103	211	175	175	..	600	18	205	155
3. Padrauna ..	44	197	183	177	216	215	181	155	227	208	213	1	261	115·35	244·15	192·23

CHAPTER III

AGRICULTURAL IMPROVEMENT

1. Planning implies not merely co-ordination of all departmental activities such as agricultural improvement, co-operation, irrigation development and subsidiary employment in agriculture in each centre of work, but also co-ordination in each particular field. In agricultural improvement, the different activities which should be closely linked so as to allow of co-operation and to prevent waste of expenditure, time and personnel are—

(*a*) Agricultural research.

(*b*) Field experiment.

(*c*) Consolidation of holdings and crop planning.

(*d*) Cattle improvement.

(*e*) Fruit farming.

(*f*) Agricultural engineering.

(*g*) Agricultural marketing.

(*h*) Propaganda.

The advantage of agricultural planning will be to focus the different lines of work of Government departments towards common objectives, e.g., the creation of agricultural wealth by new cropping, higher yield or cheaper production.

2. While the improved varieties of wheat and sugarcane have added enormously to the wealth of the population especially in the Upper Doab, cotton in the United Provinces is only an admixture of strains and consequently its value for grading and standardization is much less than in the Punjab and Western India. The presence of the pink boll worm has been the main factor militating against the introduction of long staple varieties. Legislation to deal with this pest should be given serious consideration. The millets of this province, which, rather than wheat, must be regarded as the staple food of the peasantry also have derived but little benefit from the experiments that have so far been carried out in scientific breeding and selection. Research in wheat, cane, cotton and rice in this Province has yielded important results increasing considerably the wealth and food supplies of the people. As considerable areas grow the lesser millets which represent the food of the poorer sections of the population, we consider that agricultural research work for evolving improved varieties of these should now be taken up systematically in suitable centres.

3. A great progress towards improved farming may, however, be made as the outcome of field experiments applying laboratory results, which have already been achieved, to local conditions of soil and climate. The staff of the Agricultural Department has to be specially strengthened for such purposes in the area of economic planning. The cultivator is conservative as regards the choice of his crops. The area under such crops as cotton and oil seeds admits of considerable expansion in this province while other very important improvements in agricultural practice are indicated by the substitution of rice and maize for cheaper millets, the expansion of pea, gram and other legumes and the spread of double-cropping in fields where the rotation of rice and peas in now observed, especially in the eastern districts.

4. Fruit growing is another industry which similarly admits of research, orchard experimentation and expansion. Large tracts in the province are suitable for fruit growing on a large scale. The possibilities of undersized holdings to support a large population through fruit culture and vegetable gardening in association with cereal-growing have to be explored in the area of planning. The necessary staff of experts should be provided who may offer advice and guidance. The Agricultural Department should also give the lead as regards the preservation of fruits both by demonstration and precept.

5. For the encouragement of fruit development Government should grant—

(*i*) Concessions in irrigation rates for fruit gardens of all kinds.

(*ii*) Government should exempt gardens of all fruit trees from land revenue.

(*iii*) The Tenancy Act should be suitably amended in order to make it possible for a cultivator to get rights of growing orchards through the Collector after paying a reasonable sum as compensation to the landlord, just as the landlord has the right to acquire the land for farm, etc. under sections 40 and 41.

(*iv*) *Taqavi* loans should be given to *bona fide* applicants for fruit gardening and planting of trees. If necessary the law may be amended.

6. We also recommend that District Boards should acquire small plots of land and attach gardens to each of their village schools and along the main roads. Similarly the Municipal Boards, Town Area Committees and Notified Area Committees should plant gardens in the vicinity of the towns.

7. In the Punjab experiments are being tried to plant timber and other trees on spare land on either side of the *pucca* and village roads. Trees are being planted in several rows and where necessary fenced with wire in order to protect them from animals. This has considerably helped fruit farming. We suggest that similar experiments should be tried by the Government and District Boards of these provinces.

8. It is not often realized that there is a limitation to the improvement of crops by plant breeding and the introduction of new crops. That limitation depends upon the indigenous agricultural practice. A heavier yielding type like the improved sugarcane must make greater demands on the soil equivalent to 100 to 120 lb. of nitrogen per acre and its introduction is to be accompanied by a change in the local system of agriculture which will enable the soil to regain its fertility. Unless this is done the yield of the new type must inevitably deteriorate until a new balance is struck between crop production and regeneration of soil fertility. This balance will probably come somewhere about the level of the old yield of the local crop. All this necessitates provision for a more adequate manuring and judicious crop planning including the cultivation of green manure and fodder crops in the agricultural programme. The improvement of local agriculture in the area of experimentation may be carried out along the following lines and through these agencies:

(1) The selection and distribution of pure seeds of all crops should be controlled by the establishment of seed-stores, and co-operation of the cultivators in the matter of seed distribution should be secured by offering them certain reductions of prices, bonuses, etc. Co-operative Societies should also be assisted in making storage, etc. The aim should be to establish a seed-store in every village through the agency of the resident organizer in his circle of 15 villages and through the *panchayat* and *patwari* in the wider area of the broadcast programme.

The Revenue Department should maintain a record of all areas brought under improved crops. Rewards should be given to *patwaris* in accordance with the increased area brought under improved varieties of crops every year.

(2) The stocking of improved agricultural implements, cane crushings mills, water-lifts and buckets in the Government farms and their distribution through—

(*a*) The co-operation of cultivators to whom reductions of prices, bonuses, etc. may be given;

(*b*) The grant of *taqavi* loans for the purchase of agricultural implements and machinery.

(3) An intensive and vigorous campaign should be carried on for the use of night-soil as manure and against the use of dung-cakes as fuel.

(4) Demonstration classes should be started by each resident organizer and village *panchayat* within the cultivated area where the results of introduction of a better variety of crop, a better implement, a better system of cultivation or a more adequate manure may be shown to peasants who cultivate in contiguous fields.

(5) Direct propaganda by means of lectures, shows and exhibition vans.

(6) The establishment of Co-operative Societies such as agricultural supply and better farming societies in the area of experimentation which would provide other links between the field staff of the Agricultural Department and the agriculturists of the locality.

In all agricultural planning the following things are essential if immediate progress may be expected :

(*i*) The methods of improvement of crops, agricultural practice and manures must utilize the results of experience of generations of soil and climate.

(*ii*) Field demonstrations should be arranged on average farms situated in the midst of the peasants' holdings and a rigorous economy of expenditure should be aimed at. There are already about 12,000 field demonstrations in the United Provinces every year. These should be concentrated as far as possible in the new rural reconstruction centres. At present the demonstrations are too few. Quick progress can be achieved only if demonstrations could be carried out in every village. An arrangement might be made according to which the *patwari* or the village *panchayat* selects a suitable cultivator from each village who may be called to certain centres where he receives instruction from the agricultural staff in particular demonstrations.

(*iii*) Subsidized farms might be established in villages on condition that a cultivator conforms to the agricultural standards and practices recommended by the Agricultural Department.

(*iv*) The field staff of the Agricultural Department must be increased in numbers and their drive must be supported by local *militia* represented by the resident organizers, *patwaris*, *panchayats*, Tahsil Agricultural Associations and Better Farming Societies.

(*v*) The resident organizer who must in the first instance go through the courses on the theory and practice of agriculture and co-operation in one of the Agricultural Co-operative Training Institutes should obtain a course of practical training for some months in the Government agricultural farm of the district where he works. Since he will be the most important local link with the villagers of his circle of 15 villages, he must have an intimate acquaintance with the crop improvements of his own region.

The training, however, which is given in the Institutes from which supervisors of co-operative societies and assistant village guides are being recruited at present leaves much to be desired. It must impart a more practical bias in agriculture, field technique and rural reconstruction in general in order that the resident organizer, co-operative supervisor or village guide recruited may be fitted for the tasks of the Indian Socrates in his village.

CHAPTER IV

Consolidation of holdings and crop planning

1. The crux of agricultural planning centres round, in our opinion, the problems of consolidation of holdings and crop planning. The majority of the holdings in the Indo-Gangetic Plain, Central and East, are undersized. Where agriculturists are cultivating uneconomic holdings they can hardly make their ends meet, have no surplus and are in chronic debt. It is futile to apply any economic planning to their case. The potentialities of scientific cultivation which would mean investments for better cattle, better appliances, better seeds and better fertilizers are nil in their case. Nor can such agriculturists profit much from a country-wide campaign of better marketing, removal of illiteracy and better sanitation.

2. Considering the importance of compactness we suggest the following legislative measures on the lines of the Central Provinces legislation on the subject:

(*a*) If 33 per cent. of the *zamindars* and tenants of any village so apply, the village should be consolidated into compact blocks by order of court, a form of "chakbat" partition being applied. Reference to soil values should not be disregarded as, for example, so many bighas of statutory land may be equivalent to so many bighas of occupancy land and so on.

(*b*) Cases of exchange of contiguous plots should be exempted from the usual stamp and registration charges.

(*c*) Transfers of plots below a specified area (5 acres being the limit) should be refused registration, if such transfer is not made to the co-sharer or to the owner or tenant of adjoining fields.

(*d*) No tenancy should be divisible under section 37 of Agra Tenancy Act or as a result of an application under the Land Revenue Act, if by such division any of the plots would be less than 5 acres.

(*e*) A tenant should have the right of pre-emption over a vacant holding adjoining his plot at the market rent-rate.

(*f*) A *zamindar* may not lease vacant lands under 5 acres in area to new tenants who have no other holdings in the village.

(*g*) Exproprietary and occupancy tenants should be granted the rights of sale in favour of a Co-operative Consolidation Society or of a tenant who wants to secure contiguous plots provided that the society or the new tenant pays to the *zamindar* a reasonable proportion of the purchase money.

(*h*) The fee for survey, re-stripment, etc. by the revenue staff should be fixed on a low scale like that adopted in the Central Provinces.

3. Legislative measures, rewards to *patwaris* and *kanungos* who show the best results of redistribution of holdings, the organization of Co-operative Consolidation Societies and a drive from the *zamindars* should all aim at removing what is now the insurmountable barrier to all agricultural improvements.

4. A couple of Co-operative Inspectors working in the districts of Moradabad and Bijnor have achieved satisfactory results as regards consolidation in about 80 villages. Such work in which no compulsion is employed could be extended to other districts if the field staff of the Co-operative Department were strengthened. It will be advantageous to borrow the services of an officer who has had experience in consolidation work in the Central Provinces for a forward drive to the movement in the province.

5. Consolidation of cropping has important agricultural advantages especially in areas under such crops as sugarcane, wheat and cotton. This has to be pushed along with rearrangement of holdings both by the resident organizers and by the village *panchayats* and *patwaris*. The experience of the benefits of consolidation of cropping in the tube-well areas justifies the employment of additional staff for such purposes in other areas.

6. In spite of the increase of population by about 3 millions during the last decade the average net cultivated area of the province decreased by 1 1/5 lakhs acres and the double-cropped area by 6 lakhs acres. The latter was reduced by as much as 6 and 9 per cent. respectively in the central and eastern districts. In one district, namely Jaunpur, whose double-cropped area is one of the largest in the United Provinces, such area decreased from 192,000 acres to 152,000, between 1918 and 1933. Even in a prosperous district like Meerut the percentage of double-cropped area to the net cultivated area diminished from 32·8 as the average for 1914—1918 to 28·3 as the average for 1927—1933. Such decreases are no doubt due to the present agricultural depression. Cotton has decreased in several districts due to unfavourable seasons, increase of cane cultivation, cheaper cotton prices and

the damage from the pink boll worm. With an increasing fragmentation of holdings fallowing is sometimes excluded and the proportion of double-cropped area tends to be reduced in order to maintain the balance between crop production and soil replenishment.

7. All this stresses the need of a judicious crop planning especially in the areas where cane cultivation has spread very fast. No one denies that the agricultural wealth of the province has enormously increased during the last few years by the expansion of the cane area of which about 90 per cent. is now of improved variety but few realize that the cultivator is in considerable areas largely banking on the soil's fertility and frittering away the soil reserves intended for the future generations. Could there be otherwise such considerable areas of widely farmed ratoon which is definitely injurious to the soil? Cane cultivation in the eastern districts of the province and in Oudh also tends to decrease the area under pea, gram, *arhar* and *masur* and this reduces the amount of valuable protein available in the dietary of the lower grades of cultivators. Further the extension of the cane area has tended to reduce the fodder crops formerly grown in the customary rotation and this has led to under-feeding of the live-stock.

8. Crop planning under the conditions of heavy population pressure must be approached from a new angle, viz., devising for each zone a judicious crop rotation which may ensure the most economical use of land and of man and animal labour on the farm and at the same time yield the highest number of calories per acre of holding. Our intensive investigations in Gorakhpur villages indicate that in the small holdings as sugarcane expands fallowing is given up and pea and gram, important sources of food for a vegetarian population, are reduced. One may apprehend that the dietary suffers in quality here. Village custom reacts to the situation by resorting to the practice of giving wages in pea, which is getting popular. On the whole the cultivator sadly needs guidance in order that his agricultural adjustment in the cane zones succeeds better than by following the principle that all will be to the good if he only directs his farming operations according to the market. In the cane areas we visited in Gorakhpur an appropriate crop planning would be: early paddy and *juar* (4 months); peas and gram (4 months); green manuring with *sanai* (3 months); sugarcane (1 year).

9. As a matter of fact on account of the present low yields of cane on cultivators' holdings ranging from 300 to 350 maunds per acre as against 1,000 to 1,200 maunds per acre on Government and big *zamindari* farms the same outturn could be obtained

from half the area under cultivation at present in the province, if the propaganda against ratooning and for liberal application of good manures is intensively pushed. This will release half the present area under sugarcane for the cultivation of other food crops or for fallowing which will provide to the soil the much needed rest which the customary rotation does not supply.

10. The Co-operative Marketing Board at Kasia, Gorakhpur, which deals with about 150 villages was, we found, fully alive to the dangers of ratooning, curtailment of fallowing and of other food crop areas by the majority of small holders with whom they deal and suggested voluntary restriction of sugarcane through *panchayats* and Co-operative Societies.

11. A legislative enactment for prohibiting ratooning for more than a year or the withdrawal of irrigation water supply from ratoon fields, and the fixation of definite quotas of sugarcane areas for each province by an all-India arrangement will have to be carefully considered immediately as it is estimated that India will be self-sufficient with regard to its supply of sugar at an early date. Delay would mean the expansion of cane area to an extent which will affect both soil resources and the prices of cane, and aggravate the effects of the present agricultural depression. The economic mistake of unrestricted increase of jute area in Bengal should be avoided in the case of sugarcane. The volumetric supply of irrigation water which has been recommended by both the Royal Agricultural and the Irrigation Commissions would prevent the excessive use and wastage of water and may restrict the cane area in the province.

12. The scheme of cane development and marketing recently started in the province, in which the sugar factories are co-operating with the Government for the introduction of cane of different varieties so that the needs of the factories at the various periods of the working season may be met, for improvement in the standard of manuring, for the supply of credit to the growers and for better marketing is an instance of concentrated co-operative work in the sugar industry zones. Rural reconstruction centres should be started in areas round the sugar factories and the campaign for better farming and marketing started by the Co-operative Department should be combined with other developmental activities. The supply of manures in or along with irrigation water, by Co-operative Marketing Boards and other Co-operative Societies or by the sugar factories which may make advances of manures to growers and recover the price from the cane supplied would meet the extra call on the soil by sugarcane. Green *sanai* manuring is being adopted in some cane areas and its introduction so long as it pays the cultivator in the long run

is also a matter of organized propaganda. This is another instance of crop-planning the necessity of which is forced on the agriculture of the province by its increasing numbers and the sudden expansion of an exhausting crop like cane.

13. As our population pressure increases an appropriate crop adjustment would be an increase of the production of peas, grams and pulses in substitution of grain which yields less protein per unit of land, and of oil-seeds, yielding vegetable oils and fats. A systematic crop and food planning would correct poor and unbalanced diets and distribute the labour of the farm to better advantage throughout the year.

CHAPTER V

ANIMAL HUSBANDRY

1. The gradual expansion of cultivated area and conversion of pasture into tilled lands have resulted in the improverishment of cattle in the province. The heavier the population, the smaller is the holding. The inability to devote any but a mere fraction of the tiny holding to fodder crops aggravates the fodder shortage which leads to the inefficiency of cattle. On the other hand, the small holder appears to compensate for the inefficiency of his bullocks by breeding more and more cattle. This vicious circle may be vividly illustrated by contrasting the conditions of fodder cultivation and cow keeping in the districts of Meerut and Bulandshahr on the one hand and Gorakhpur and Basti on the other. The figures are those of the cattle census of 1930 in which it was estimated that 3 seers of milk per day from a cow and 4 seers from a cow-buffalo represent yields which are economic minima :

——	Average holding	Percentage of average holding to economic holding	Percentage to the net area cropped of			Number per 100 acres of net area sown of			
			Fodder crops	Wheat	Rice	Cows giving 3 seers of milk or more	Other cows	Cow-buffaloes giving 4 seers of milk	Other cow-buffaloes
Meerut ..	6·7	126	15·2	33·3	1·5	4·9	4·4	11·6	2·9
Bulandshahr	6·7	126	6·2	21·6	0·3	4·1	4·1	11·8	4·2
Gorakhpur	4·3	107	1·1	20·5	40·6	0·2	17·7	0·6	6·5
Basti ..	4·3	107	1·9	24·1	48·4	0·08	19·5	0·3	9·5

2. In the upper doab population pressure has evolved an efficient mixed farming, a moderate number of live-stock being maintained on fodder crops. Fewer but efficient cattle here provide nutrition for the people, help materially to maintain soil fertility and increase its total outturn for the cultivators. In the eastern districts of the United Provinces on the other hand, a considerable proportion of the cattle are useless. These eat up the fodder sadly required for the better stock so that their multiplication implies a progressive deterioration of the breed of cattle and the economic position of cultivators. In the province as a whole only about 6·3 per cent. of cows yield 3 seers of milk per day and 26·5

per cent. of the buffaloes yield more than 4 seers of milk. Out of such cows and buffaloes 75 per cent. belong to Meerut and Agra divisions. As regards bulls, there is only one bull to 263 cows in the province while the report of the Royal Commission on Agriculture mentions one bull to 56 cows as a conservative requirement. Bulls are decreasing due to scarcity of fodder, disease and decline of the practice of dedication. In the sub-Himalayan East which includes Gorakhpur and Basti Districts, the number of bulls declined by 23 and 30 per cent. between 1920—25 and 1925—30 respectively on the figures of the 1920 census while in the Indo-Gangetic plain West these increased by 22 and 16 per cent.

3. On the whole, therefore, under the above circumstances and in the absence of preventive measures we may assume that there has been deterioration of breeding cattle throughout the province. Even where there are ample pastures as in the districts of Lakhimpur and Sitapur which maintain herds of cattle, the breed is not improving on account of the multiplication of inefficient uneconomic stock and the absence of precautions of segregating the sickly and unhealthy bulls from the herds and the latter from those bulls. Breed deterioration has been, however, the greatest in the rice tracts in the eastern districts where there is a larger proportion of useless half-starved beasts which roam about in the country-side prepetuating their species and further reducing their quality. It may be estimated that the number of working bullocks in the province as a whole could be safely reduced to one-third of their present number without affecting the standard of farming and rural transport. Egypt maintains only 25 cattle per 100 acres of sown area as compared with our province's 88.

4. The remedy lies in the following directions :

(*a*) The evolution of suitable types of dual-purpose animals, the males being efficient as field workers and the females as milch animals. Such cattle, e.g. Hissars are obtainable in the country and are among the best breeds possessing these dual qualities. Such dual breeds will render buffaloes largely superfluous as sources of milk and tend to reduce their numbers.

(*b*) The castration of all unfit and useless male stock. That a notable victory has been won over popular prejudice is shown by the fact that in the Punjab alone in 1932-33, 482,000 animals were castrated. Not only scrub bulls but also uncastrated bullocks used for carts should be castrated to prevent damage to the breed. Consideration should be

given to passing an enactment for the purpose on the lines of the Bombay legislation.

(*c*) Ringing of bad cows so as to make covering impossible. This is done in south-west Punjab.

(*d*) The expansion and improvement of fodder cropping and pasturage and the introduction of silos, stall feeding and controlled grazing in favour of the superior stocks.

(*e*) The development of dairy farming in association with intensive agriculture which will supply milk, butter or ghee to the dietary or add to the agriculturist's income and prompt him to look after the milch cattle better.

5. As regards breed improvement the Government scheme of the distribution of stud bulls to approved indentors on payment of Rs.22 per bull should be pushed in each rural reconstruction centre as well as through the *patwaris* by offering an allowance of, say, Rs.2 per bull to any one through whom an indent for a Government stud bull is secured either in cash or *taqavi*.

6. More funds should be provided for developing the bull-producing capacity of existing bull breeding farms and for purchasing suitable bulls wherever available.* In forest divisions with large grass areas, tracts might be set aside for cattle improvement work. Stud bulls could perhaps be kept under the supervision of range officers and any other bulls allowed in these areas would have to be sterilized.

7. Such districts as Pilibhit, Shahjahanpur and Bijnor and places like the Najibabad and Dhampur jungles possess adequate pastures and herds of cows. It will be easier to improve the live-stock here by importing good bulls than in the over-stocked rice tracts in the east.

8. It is estimated that in the cultivated tracts of the province pasture provides maintenance for breeding cattle for about four months in the year while for the remainder of the year this has to be supplemented by supplies from the cultivated area. In the more heavily populated districts little grazing land is now available and what there is has deteriorated as a result of many years of excessive grazing. The holding is also small and cannot afford to grow much fodder. The expansion of cane has also restricted fodder cultivation. Here crop planning with special reference to the maintenance of the live-stock from the farm produce suggests itself as a remedy. Here and there the peasant is introducing fodder crops into his customary rotations. There is a growing tendency in Meerut, Muzaffarnagar, Bulandshahr and Aligarh

* Evidence of Mr. C. H. Parr.

Districts to introduce lucerne into the cereal rotations. This has probably been stimulated by the Remount Department House-breeding Operation in these districts, but the practice once adopted has been continued after cultivators have realized the value of lucerne in cattle-feeding, particularly for working bullocks. In sugarcane areas bersem could possibly be introduced with good results from the point of view of cattle nutrition and maintenance of soil fertility, which are endangered.*

9. The small holder in the province has, however, his own way of easing the fodder difficulty; he sells his cattle in March and April when his stock of fodder from the preceding *kharif* crop has been consumed and when also the cattle can be spared. He then buys new ones in June for his next seasonal agricultural operations. This is an exceedingly wasteful method which, however, is prevalent in most parts of the province.

10. Certain areas of the province are subject to recurrent and serious fodder scarcity. It is one of the paradoxes, with which we are so familiar in India, that the ravine tracts of the United Provinces which suffer from periodical fodder famines are particularly fitted for the breeding of the best herds of cattle in the province. Centuries ago they were the great breeding ground for cattle and they still produce magnificent types of goats. Thus if afforestation schemes are started systematically in each district where the ravine lands are found not merely agriculture but animal husbandry and dairying will revive, the plantations protecting the agricultural lands from scour and erosion and furnishing valuable grass lands for the live-stock. The Chief Conservator of Forests has stressed in his evidence that fodder reserves are being steadily built up in certain areas in the Afforestation Division of the Working Plans Circle. Most of these areas were originally taken up for afforestation to prevent ravine erosion and in the expectation of obtaining financial results. Now these are considered more as fodder reserves, which check the extension of ravines on the one hand and, under a system of controlled grazing, encourage the natural regeneration of shrubs and trees on the other. If the major portion of the ravine tracts were brought under a scheme of closure, fodder famines in those areas will disappear and there will be large quantities of fodder grass available for export in drought years. We shall revert to the subject when dealing with soil erosion.

11. A hay stack for every village which might preserve fodder from season to season and from year to year would stabilize conditions and the storage of grasses in silos should also be a matter

* Evidence of Mr. C. H. Parr.

of propaganda. Experiments have indicated that fodder grasses can be stored effectively, though the condition of the stacks at the close of the experimental period proves that if regular work is undertaken, it would be necessary to employ expert stackers and thatchers.

12. But the most important method of conserving pastures is the introduction of controlled grazing under the supervision of village panchayats, better farming or co-operative societies.

13. In the first place, grazing rights in common lands may be allowed only to people who cultivate a minimum area of land or possess grazing areas of their own. Secondly, all common or village grazing areas should be divided into grazing and closed blocks and these should be used in rotation. Experience not merely in Europe but also in Bombay and in some parts of this province has shown that rotational or periodic closure increases the quantity of nutritive and palatable grasses and reduces that of bad ones leading to an improvement in the weight of cattle.

14. Resident local organizers *patwaris*, *panchayats* and better farming societies could control the area under grazing and the area closed to grazing and could take action to regulate the number of live-stock kept in each village. Such regulation must sooner or later be considered indispensable in the interest of both small farming and animal husbandry. Periodic, deferred and rotational grazing is especially necessary in the ravine tracts of the province, where we can only look towards grass-land management for checking extension and erosion of ravines and for providing adequate fodder and grazing for the live-stock throughout the year. Not merely in the ravine tracts but also in certain other plains areas the communal forest *panchayat* system of Kumaon could be profitably introduced resulting in benefit to grass, fodder, cattle-breeding and water supply. The existing laws and rules relating to village *panchayats* should provide for acquisition, upkeep and management of pasture lands.

15. Cattle epidemics sweep away a large number of cattle and cause considerable agricultural loss. The present agency for reporting cattle diseases, viz. the *patwari*, should be supplemented. One witness recommends that the chaukidars of villages liable to cattle epidemics should be supplied with printed and embossed postcards on which they have to enter only the name of the village and the number of seizures before posting it to the address of the veterinary assistant. Rinderpest and foot and mouth diseases are contagious and all district boards should be made to pass bye-laws making segregation of affected cattle obligatory and prohibiting the trade in skins of diseased animals. A

bye-law of this description passed at Dehra Dun led to an effective control of these epidemics. Inspection and inoculation of cattle for rinderpest before these are taken out to graze in large numbers in the pastures in the Tarai and submontane tracts may reduce cattle epidemics. Only such cattle might be permitted to graze as can produce a veterinary certificate. Legal enforcement of the burial of cattle dying of contagious diseases in deep pits without skinning is also necessary. The present staff of veterinary assistants although highly trained is insufficient in numbers to deal effectively with the outbreaks of epidemics which may occur simultaneously in many villages. A certain number of assistants should always be kept in reserve. This reserve should be a mobile one readily concentrated for immediate action in any district in which disease is reported. Consideration should also be given to subsidizing local veterinary private practitioners with a view to building up a veterinary profession as exists in other countries. A stock of phenyle and other medicines could be kept with the *panchayats*. If they are given the necessary instructions they may render first aid measure satisfactorily. Since epidemics occur simultaneously in a number of villages it takes several days for the veterinary assistant to arrive at the village.

16. For giving facilities of watering and bathing for village cattle troughs should be provided and village tanks preserved for bathing purposes. In the tube-well zone a number of troughs at different wells have been provided, the cost of which hitherto has been subscribed by various officers. Wallows and small village tanks may be filled with water from the *gul* at times of low irrigation demand when there are both energy and water to spare.*

17. In such districts as Etawah, Etah, Muttra, Agra, Aligarh and Meerut there are great opportunities for the improvement of dairy farming on modern lines. Cattle-breeding and insurance societies which have succeeded in other parts of India and co-operative *ghi* making may succeed very well here, while the establishment of depots for the collection, pasteurizing and cooling of milk and the provision of a cold storage van on fast trains for the transport of milk and butter to distant cities may contribute a great deal towards establishing the dairy industry on modern commercial lines.

* *Vide* Sir William Stampe's evidence.

CHAPTER VI

Prevention of soil erosion and desiccation

1. The denudation of soil due to concentrated bursts of monsoon rainfall in areas along the banks of the Jamna, Chambal and other rivers and in tracts adjoining hill slopes in the sub-montane regions has resulted in the formation of a vast and intricate net work of ravines and the conversion of cultivated areas into barren stretches. The actual area of ravine lands has been estimated at about 8 million acres in the province.

2. The districts of Dehra Dun and Saharanpur have lost a good deal of cultivable land due to flood and scour caused by rain water running down the deforested hill slopes in rapid heavy torrents and leaving the beds dry a few hours after the storm. But soil erosion has its worst effects in dry and arid areas where rainfall is generally below 25″ because here the luxuriant vegetation of the rainfall tracts is absent. In these dry areas the rainfall is highly ill-distributed, a heavy rain falling within a short period. Thus it is that considerable areas in the districts of Etawah, Agra, Muttra and Jalaun are so speedily and completely drained that they have almost become destitute of vegetation. In Etawah District alone there are about 1,200,000 acres of ravine land and 1,000 acres of good cultivable land are annually lost to cultivation as a result of erosion. The Etawah Tahsil, it is estimated, has already lost about 15·06 per cent. of its total area. In Bah Tahsil of the Agra District about 35·9 per cent. of the land is barren due to excessive erosion.

3. Again, in these dry areas there is erosion not only by water that flows over them but also by the prevailing hot and dry winds which often blow off the fine particles from the surface. The character of the soil and the sub-soil has also a profound effect upon the tendency to erode. The fact that a soil is or is not covered with forest or grass, or is clayey or sandy, influences the rate at which it absorbs water and the amount of erosion caused by the surface run-off. The black soil appears to be particularly susceptible to run-off and this explains the relatively rapid speed of ravine formation along the Chambal. The effects of soil erosion also vary according to the general slope of the ground.

4. Further, a characteristic of the Jamna and its tributaries is the very inadequate area of forest lands protecting the banks and head-waters and drainage areas. This region for centuries also

has been maintaining large stocks and herds. Unlimited and uncontrolled grazing of innumerable flocks and herds, continued for generations, has led to a complete destruction of vegetative cover in the ravine areas, which has led to the increase of run-off and over-drainage.

5. Where the ravines touch the cultivated lands the rush of water is so great in the monsoon months that the whole upper soil tends to be washed out. Thus a large portion of the cultivated strips adjoining ravines is also rendered useless.

6. The cumulative effects of over-drainage and scouring have resulted in the lowering of sub-soil water level so that a large number of wells have been dried up causing serious privations to men and beasts. Throughout the whole of the ravine stretch, the extreme length of which is 70 miles and the width is about 13 miles in the centre, no water is to be found except in the deep wells and in the main rivers. The monsoon rain here penetrates to a few inches only and this quickly dries up leaving the soil almost destitute of moisture down to the water level, 100 feet or more below. What soil erosion, if left unchecked, can bring about is clearly indicated by the deterioration in Bah in Agra District.

7. Throughout the Bah Tahsil the depth of well water-level is very great ranging from a minimum depth of 50 feet in the north to between 70 and 90 feet in the west and from 90 to 100 feet in the eastern half. The water level seems to have sunk more along the Jamna than along the Chambal. We read in the Rent Rate Report of 1929, "There is no reason why erosion should be greater in the bed of one river than in that of the other. The difference is probably due to the diversion of the Jamna water to canals." The wet area per well is very small (less than one acre) where the depth of water is more than 55 feet. Out of a total number of 5,785 wells, those whose depth of water level is more than 55 feet are 5,730 in number. The average cultivated area has diminished by 2,000 acres on the whole and the village site has decreased in every circle in Bah Tahsil between 1319 and 1334 Fasli. Similarly in South Khairagarh the water level is very low.

8. In Etawah and Muttra the water level has sunk considerably of late years. It may suffice to mention that in one tube-well sunk in the Muttra District it was necessary to go down 350 feet before an adequate supply of water could be obtained.

9. Not only the supply of drinking water is affected but the labour of lifting water for irrigation has increased leading to the abandonment of wells. Between 1875 and 1931 the number of

wells decreased from 62,566 to 47,342 in Agra, from 35,151 to 20,801 in Muttra and from about 40,000 to 10,000 in Etawah.

10. The gradual decline of water table is accelerated after a cycle of drought years and there is not merely increase of strain on human and cattle power but there is also diminution of its returns proportionately.

11. In several of these arid districts the expansion of agriculture has slackened between 1921 and 1931 and in some both the net cultivated and the twice-cropped areas have shown remarkable decreases. Dry conditions are becoming more and more manifest in some and the evidence of the spread of desert plants even as far as Agra District is full of menace. We may group the districts in a descending order so far as unfavourable agricultural and hydro-graphical conditions and liabilities to famines are concerned in the following manner:

Order of districts according to agricultural insecurity		*Index of aridity	Order according to aridity	Percentage of gross cultivated area which is irrigated	Order according to irrigation
I	1. Agra	17·0	2	25·3	6
	2. Muttra ..	15·5	1	31·8	4
	3. Farrukhabad ..	22·0	7	24·6	7
II	4. Jalaun	22·0	8	9·5	9
	5. Hamirpur ..	23·0	10	4·1	11
III	6. Etah	18·2	4	38·1	3
	7. Etawah ..	21·5	6	28·3	5
	8. Jhansi	22·0	9	9·8	8
	9. Banda	27·0	11	5·1	10
IV	10. Aligarh ..	17·0	3	45·9	1
	11. Mainpuri ..	21·2	5	42·2	2

*The Index of Aridity $= \frac{\text{Annual Precipitation (milli metres)}}{\text{Mean Annual Temperature in degrees centigrade} + 10}$

is an index used by Martonne to indicate the character of vegetation. It has been used for the study of Agricultural trends in India by Mukerjee (*vide* article on the Agricultural Regions of the Ganges Plain, Indian Journal of Economics, 1926).

12. Several of the above districts, indeed, have exhibited declining conditions. Any drought produces its greatest effects on cropped areas in these districts. And it is also noteworthy that these districts are found in a more or less compact zone.

13. The considerable fall in the water level in wells in parts of Agra, Muttra and Etawah Districts amounting in some areas to 75 feet within the last seven decades and the spread of desert plants even as far as Agra District betoken an agricultural calamity of the first magnitude which the Government and the public do not adequately realize. The intensive strain on men and cattle, the abandonment of wells, the increase in the cost of agriculture and an all-round decline of agriculture are all visible in one compact zone in the south-west where a concentrated agricultural planning is most urgently called for.

14. Among the measures necessary in this direction the following may be stressed :

(*i*) Assistance to the peasants in the construction of masonry wells by means of a generous system of *taqavis* and the maintenance of a boring staff in each tahsil which will undertake well surveys and locate sites in doubtful areas.

(*ii*) The extension of the hydro-electric grid into the dry tracts of Agra, Muttra, Etawah and other dry districts, which cannot at present be commanded by canal irrigation and the establishment of a net work of State tube-wells from which water may be supplied on a wide scale to the cultivators, the time for payment of water rates being carefully adjusted to crop harvesting conditions.

There are still considerable numbers of fine open wells in the arid tracts which may be fitted with electric pumping sets and worked by electricity at lower rates during off-peak hours. On account of the depth of these wells the rate should be much lower than in the upper doab and Swedish pumping sets may be hired for the purpose of experimentation.

Where ordinary tube-wells are not possible on account of fine sand deposits prevailing in the sub-soil strata, "cavity" wells may be bored and these might be worked by electricity.

(*iii*) In arid tracts outside the present range of the grid system the Government should construct and manage deep masonry wells and sell water by volume as in the case of the tube-wells. In some States in Central India the durbar owns and manages deep open wells for irrigation.

(*iv*) The organization of Co-operative Irrigation Societies bringing together small holders who may thus obtain the benefit from State-owned tube-wells. Consolidation should be pushed in the arid tracts as it will economize the use of water from the State tube-wells, since the loss by leakage and percolation in transit to the plots is reduced.

(*v*) Encouragement to the *zamindar* in the construction of tube-wells for the supply of irrigation water for himself and his tenants, the Government limiting the maximum water rate he could charge and specifying the well he could instal.

(*vi*) The substitution of the Persian wheel for the *charsa* in all masonry wells now in use.

(*vii*) The lining of irrigation courses by tiles or the use of hard-baked pipes to prevent leakage and percolation.

(*viii*) Making *bundhs* or embankments for the storage of rain water for purposes of irrigation during the dry months. In the Kiraoli Tahsil of district Agra adjoining the Bharatpur territory, which the Committee visited, whole tracts of land are becoming desolate because the State authorities have recently cut off irrigation facilities to the area from the reservoir within their territory by closing the outlets in the *bundhs* situated there. It is necessary to come to some understanding with the Bharatpur Durbar to restore to the British subjects the privilege which they had been enjoying for times immemorial and thus save the area from desiccation and ruin.

15. Much more important in the fight against desiccation in these tracts are :

(1) The planting of a chain of village groves and forests and introduction and propagation of suitable defensive vegetation against the encroachment of loose sands which have been set free by the disappearance of scrub jungle and grass. Small scale experiments indicate that the barren sandy areas can be afforested by strong cuttings of *Albizzia spp.*, *Dalbergia sissoo*; *Gmelina arborea and baib* grass. The Government should offer land revenue remissions or reduce water-rates for village afforestation by the *zamindars*.

(2) Prevention of soil erosion and the conservation of moisture and grass by the building of *bundhs*, field embankments and drainage works, especially at the heads where the ravines are eating into the flat lands. In many cases the heads of the ravines are in the middle of cultivated fields. Thus the co-operation of officers of the Agricultural Department and *zamindars* is necessary for measures of soil

preparation, artificial regeneration and closure to grazing. Where active gullying by monsoon water is cutting away field banks, much can be done by a timely use of simple engineering by plugging the gully with stones, then sowing it with lucerne, *bersem* or grass and leaving a few feet around the sore spot unploughed when the rest of the field is worked.

(3) The introduction of suitable fodder and crop rotation which may prevent a further increase of arid conditions.

(4) A careful investigation of the water demands of the various crops and of the possibilities of water-saving by a combination of fodder production and improved methods of dry farming.

(5) The introduction of the Javanese system of adjusting the quantity of water supply to crops and field systems by the provision of irrigation courses from State-owned tube-wells, "cavity" or other wells with gauges for the proportional distribution of water and the construction of drainage channels. Where water is sold by volume, as in State tube-wells, wastage has been greatly reduced, one tube-well cusec irrigating 4 to 5 acres a day against 1·5 to 2 acres done by the canal cusec.

16. Desiccation due to the decline and increase of irregularity of rainfall within the last few decades and the advance of the Indian desert in the Agra-Muttra region has reached a point at which the peasant by himself with the increase in the cost of his cattle, well-implements and cultivation generally is now fighting a losing battle with Nature. If the entire tract is to be protected from the vicissitudes of drought and famine, recourse must be had to a comprehensive scheme of State afforestation in the villages and well irrigation from tube, cavity and deep open wells under State ownership and management working either by hydel power or by oil and steam. An important witness observes in this connexion :

> "How far the extension of desert is a resistless natural force can be argued but much can be done against it. No raising of the spring level can, in the most favourable circumstances, be hoped for a few years, but if measures are not undertaken the whole area will go to complete desert."*

*Evidence of Mr. R. H. Saloway.

CHAPTER VII

IRRIGATION DEVELOPMENT

1. With the completion of the Sarda Canal system the major projects for flow irrigation were exhausted and the steps that remain are—

(*i*) A better distribution and economy of canal water-supply.

(*ii*) The development of the system of State tube-wells worked either by electricity or by oil and steam engines.

(*iii*) The development of masonry well construction.

(*iv*) The use of lower river reaches for pumping water high enough to command more cultivated areas.

(*v*) The construction of storage basins by dams and embankments.

(*vi*) The discouragement of reclamation of tanks and *jhils* for cultivation.

(*vii*) Prevention of loss of water due to evaporation and percolation in the channels by aligning them with brick, tile or hessian.

2. One of the chief methods of mitigating the agricultural decline and insecurity of Agra, Muttra, Etawah and other districts in the south-west would be to deflect canal water from the upper doab where there are special facilities for well construction in the alluvium. It is well known that there is a considerable waste of water in the areas irrigated by canals. In fact the cultivator undoubtedly applies more canal water for watering than is beneficial to a particular crop. In the canal irrigated fields we do not find the careful preparation, levelling and division of small compartments by *kiairis*, characteristic of the area irrigated by wells. Canal irrigated fields not only receive too much water but the depth varies from a few inches to as much as 9 inches depending upon the levels of the fields.* Due to the lower cost of irrigation and the facility of obtaining a bumper crop without much man and cattle labour in the field, there has been a tendency throughout the upper doab towards the neglect or abandonment of wells during the last few decades. In the Meerut Division alone in about 20 years from 1906—7 to 1927-28, wells have decreased in number from 114,519 to 73,437. The maintenance of wells could fill the gap of agricultural water supply in drought years and reduce the shrinkage of cropped areas.

* Evidence of Mr. F. Anderson.

As a matter of fact both well and canal irrigation have their own uses under special conditions of soil, natural drainage and cropping and the circumstances under which canal watering jeopardizes or entirely supersedes well watering cannot be considered satisfactory.

3. In the Agra Division as well many wells have been abandoned on account of the rapid decline of the water level due to drought and arid conditions, the figures of the decline being from 277,681 in 1906-7 to 220,262 in 1927-28. In some tracts, again, the water level has risen owing to canal development and defective drainage and this has increased the difficulty in the construction of *pucca* wells and has led to the collapse of *kachcha* ones.

4. Over a vast region, therefore, the respective uses and possibilities of canal watering and well watering have to be explored afresh especially as—

(*i*) while canal irrigation has reached its limits, there are large stretches of cultivated land in the canal zone itself which are beyond the reach of the canal system and where wells would render water supply more uniform and stable;

(*ii*) the spread of arid conditions in the Muttra-Etawah region has led to an all-round decline of agriculture.

5. We consider that the first and foremost necessity is that of an elaborate survey of water levels and the composition of waters (brackish waters from some wells being unfavourable for crops) over the entire region.

6. A net-work of State-owned tube-wells or masonry wells in suitable tracts in Meerut and Bulandshahr will mean a release of canal water-supply for the non-tube-well areas. Irrigation from canals must not altogether supersede irrigation from wells in the canal zone. Already an increasing quantity of water from the Ganges Canal has been diverted to the Mat Branch for irrigation in the Muttra District. The programme of releasing more canal water from other branches of the Ganges Canal in the upper doab for the drier districts in the south must now be pushed.

7. In the tube-well programme certain areas formerly irrigated by these canals will in the coming years be dealt with by tube-wells. A further extension of tube-well construction throughout the upper doab would make the deflection of the canal irrigation water supply from the north to the south easier and more abundant; thereafter emphasis should be laid on an adequate balancing of the respective needs and opportunities of the different districts.

8. Secondly, the whole of the Muttra-Etawah zone is not altogether divested of suitable sites for the construction of tube and "cavity" wells. A boring staff maintained in such districts as Muttra, Agra and Etawah and in Bundelkhand should locate sites in doubtful localities and pierce the foundation clay where it is too deep for country tools. The nature of the underlying soil strata, and the depth of the water will determine whether open, "cavity" or ordinary tube-wells should be attempted. Appropriate types of wells aided by hydel power should be tried where the depth of the sub-soil water puts too great a strain on human and cattle power and makes the cost of irrigation prohibitive.

9. Thirdly, the charge for electricty should be made cheaper for deeper wells which might be energized during off-peak hours.

10. On the whole the advantages of intensive farming and flexibility and conservation of water supply, associated with well-watering, are so great for this entire region, where the sources of agricultural water-supply are invariably inadequate in abnormal years, that the policy of having more wells will pay in the long run. When the supply of water from the canals runs short throughout the entire region it is the wells which should fill the gap and protect the crops. Thus as years pass the legacy of defences against drought will be maintained and expanded, instead of being neglected as at present. The well system will not only encourage economical irrigation and prevent an increase of the cultivated area beyond the limits at which it can be protected in a drought year, but will be the best insurance against the fluctuations of cropped area.

11. We, therefore, advocate:

(*i*) the supplementing of canal water supply by State-owned tube-wells in the Upper Doab,

(*ii*) a forward policy of construction of open, cavity and strainer wells by the Irrigation Department in the south-western dry tract, and

(*iii*) the release of canal water from the Upper Doab where well irrigation as a substitute is feasible and utilization of such water by extending and expanding existing canal distributaries in the south-western dry tract.

12. We would like to stress that the time has arrived in view of increasing pressure on diminishing water supply when the Government should—

(*a*) undertake a regular survey of possible sources and the ways and means of agricultural water supply in the Doab and the south-western dry zone,

(*b*) frame a scheme to secure the most economical co-ordination and distribution of various sources of irrigation among agricultural areas of different levels and degrees of drought. Perhaps it will be necessary to work out where, to what extent and at what levels, wells have to be run along with canals throughout the year, or at defined intervals, or whether as alternatives, or concurrently, and

(*c*) explore the possibilities of canalization of the Jamna in Muttra and Agra. When the river is in flood a new canal system from the Jamna might inundate the fields for *rabi* sowing in August and September. Mr. C. H. Parr has suggested for testing out such a scheme in a suitable area in Muttra and Agra, which might assure, if suitable *bundhs* are constructed in the fields for retaining water, at least 10 anna crops of wheat and barley and 12 anna crops of gram in drought years. In years of good rainfall full crops will result.

13. In Bundelkhand the problems of irrigation are different. Storage basins which at present exist do not serve the needs of water supply adequately. Much may be expected from the development of co-operative effort for the construction of dams, embankments and drainage works. Rivers, minor streams as well as drainage lines should be investigated and land reclamation and construction works under the guidance of agricultural engineers carried out on an adequate scale.

14. A survey of water falls in Bundelkhand and Rewah may also be undertaken for finding out suitable sites for the construction of reservoirs and for generating power.

15. Some districts in the central plain such as Partabgarh and Rae Bareli have shown a distinct fall in the sub-soil water level. In our rural investigations we found villages where a quarter of the wells have gone dry and there has been actual scarcity of drinking water. In these districts also careful well surveys should be undertaken and a boring staff maintained. These would investigate into the condition of wells and tanks and of water levels, whether tanks and wells are regularly cleansed or renovated, whether the wells that have been abandoned can be improved by boring, the cost of well construction, the draft power of bullocks, etc. It will have also to be considered whether these districts will be suitable for the sinking of tube-wells which may be energized through the grid from Fyzabad.

16. Whatever be the sources of irrigation, rain water, tank water, canal water or well water, efforts should now be concentrated

towards water saving. The following measures may be stressed in this connexion :

(*i*) In the canal zone whenever there is no full demand for irrigation water, the canals should utilize their surplus in filling tanks instead of running into waste. Irrigation done from tanks so filled might possibly be charged at a lower rate so as to encourage the cultivators to have their tanks filled.

(*ii*) The volumetric sale of canal water should be introduced. The waste of water in the canal irrigated tracts is estimated to be from 30 to 50 per cent. often to the detriment of the crop as well as the soil. There are obvious difficulties in the way of adoption of the volumetric sale of water. But its advantages far outweigh the disadvantages. The former are pointed out by Sir William Stampe thus :

> "The advantage to the cultivator in such a system is that, should there be any rainfall after he has taken one watering, he is saved buying a second, whereas in a flat rate system he gets no reduction of rate on account of rainfall. The cultivator on the canal, in other words, pays for one watering in a dry autumn followed by a wet winter exactly the same amount as those who take two or three in drier areas."

(*iii*) Volumetric sale can prevent over-irrigation, which leads to the rapid impoverishment of soil especially in the cane areas unless manuring and careful tillage are adopted. In the new Sarda Canal and tube-well areas, there is a tendency to irrigate more land than can be supplied with water, accompanied by a neglect or disuse of wells. In view of the need of protection of the cultivation of cane and sugar production against slump due to over-production, the importance of well irrigation for the cultivation of other crops such as wheat and cotton which may expand in the areas now devoted to cane, and of the superior farming methods generally associated with the irrigation from wells, the question of limiting the acreage under canal irrigation by metering deserves careful consideration by Government. We endorse the recommendation of the Hydro-electric Grid Committee that the Government should take steps to limit the acreage under irrigation by each tube-well.

(*iv*) In undulating country, field and ravine embankments planned systematically according to a programme might do much to save water.

(*v*) In districts irrigated by wells loss of water due to evaporation and percolation in earthen channels may be minimized by the adoption of the practice of lining the channels with roof tiles, etc. especially where the water is to be conducted to long distances and along porous soils.

(*vi*) The water demands of various crops require close investigation and the possibilities of water saving by a combination of fodder production and improved methods of agriculture should be explored in irrigated regions.

17. Experiments carried out by the Agricultural Department in 1932 on the Shahjahanpur farm to determine the most efficient quantity of water required for sugarcane and wheat show—

(*a*) Sugarcane :

(*i*) Frequent light waterings give a better yield than fewer heavier waterings. In all the experiments a 3½ inch watering gave the best result.

(*ii*) The heaviest yield of cane was obtained with five 3½ inch waterings during the summer. The hot weather of 1932 was particularly dry and hot and in a normal year, probably four waterings would have given the same results.

(*iii*) The sixth watering given in October increased the yield by only 2·5 per cent. over the yield of five pre-monsoon waterings. The increase is negligible and the percentage increase of sucrose was also negligible.

(*b*) Wheat :

Irrigation increased the yield from 12·0 per cent. to 42·7 per cent. according to the time of the application of water, the number of waterings and the quantity of water supplied per watering. Two irrigations, each of 2·65 inches, gave the best result. One watering of 2·65 inches gave a higher yield than two waterings, each of 2·0 inches.

18. The only practical remedies to reduce the wastage of canal water, according to Mr. F. Anderson, are—

(*i*) The construction of *kiaries* after the crops are sown.

(*ii*) Improving the watercourses which belong to the cultivators and are generally maintained by them in bad order.

(*iii*) By supplying water by the volumetric method although it is beset with difficulties.

(*iv*) By practical demonstration to show the cultivators the correct quantity of water required for every crop and the best time to apply water.

19. If the volumetric method and limitation of the acreage under canal irrigation could not be adopted, the Irrigation Department should be given full powers to insist upon efficient methods of farming and water-saving being applied as a condition of supply of water.

20. Various tracts under the Sarda Canal system show defective drainage and over-saturation. *Kachcha* wells have gone out of use due to the rise of the sub-soil water level. Certain intensive investigations in the Sitapur District have recently indicated also deterioration in the suitability of village sites, the supply of drinking water and health of the people as well as expansion of alkaline land. Excessive irrigation by cultivators, new to the practice, has also led to a great deterioration in the yield of wheat. In the district the deaths from fevers have increased from 19,078 in 1929 to 25,366 in 1932, the year of introduction of canal irrigation. The average of deaths between 1923 and 1928 was 20,309. The engineers have to deal with water-logging problems as they are arising here and there; while the cultivators have to be educated in every village in the canal zone about the proper quantities of water and its timings which may give the best yields.

CHAPTER VIII

INDUSTRIALIZATION

1. There are obvious advanages in this province for a better regional distribution of industries which may bring factories nearer the sources of their raw materials instead of being concentrated in one or two towns. A vivid instance of the benefits from large scale industries established in the countryside is afforded by the sugar industry, which because of its links with the farmer and his produce has contributed in a short period of less than five years more towards raising the tone and standard of country life in general than what textile industries could achieve during two or three decades. The industry also gains because there is no difficulty in finding the labour required. Cawnpore, on the other hand, has had labour troubles because the United Provinces labour is not mobile. The importance of this subject was emphasized in the United Provinces Census Report of 1921 by Mr. E. H. H. Edye, who observes in his written evidence, "A grid or better still a series of grids should prove the best means of stimulating the creation of isolated industries generally, though for technical reasons it does not do much to help the sugar industry in particular."

2. The distribution of sugar factories has been, however, rather unplanned and haphazard, giving rise to all the problems of zoning and fixation of cane prices which would not have arisen if the Government had intervened in the beginning. There are difficulties in Government now taking action for introducing the zoning system. But the good sense of the sugar manufacturing interests which are now competing with each other could lead to a condition which will ensure all the advantages of zoning.

3. It is suggested that in future with regard to the sugar factories the Government should permit location only after issue of a duly considered licence.

4. There are bright possibilities of the establishment of large scale industries in some important directions and the Government may help by offering facilities of technical guidance and research or granting favourable terms of contract and concessions, such as cheap supply of wood, grass, lac and other raw materials from Government forests, and of water from canals. Among such industries may be mentioned :—

(1) Paper manufacture, particularly in the Saharanpur Forest Division, where the forests have a large quantity of *baib* grass suitable for paper mills. This formerly went to

paper factories in Bengal which are now going over more to bamboos and obtain the grass they want nearer than the United Provinces. There is a paper mill which has for some time been closed at Jagadhari. The Chief Conservator of Forests, United Provinces, suggests that it might pay if the Government give favourable terms, say, for the first three years of a contract to any one who would reopen this factory.

(2) There is an opening for paint and varnish factory at Bareilly where supplies of turpentine and resin are available. It would presumably be a good centre also of linseed oil.

(3) Ochre mines exist in the Banda forests and give little return, being exploited by manufacturing interests from Bengal. These might be helpful towards the establishment of a paint industry.

(4) Lac is also available in Mirzapur and might possibly be developed in Jhansi and Banda. Shellac factories might be established through the offer of favourable concessions.

(5) Cement deposits are found in some parts of Oudh, where cement factories could be established.

(6) A prosperous alcohol industry could make a firm footing in the province in association with sugar manufacture if it were shepherded by the Government of India which could fix a minimum sale price for petrol and a lower excise duty on power alcohol, the sale of such alcohol being organized by a syndicate under Government control. If Government could insist on the admixture of 10 to 25 per cent. of sugar spirit with petrol, the molasses, which are bye-products of the sugar industry and are practically refuse, could be converted into motor spirit and utilized for running motor vehicles of all kinds.*

(7) The establishment of alkali works has also great possibilities in the province. Salt may be supplied duty free, hydel power given at cost price, while the purchase of bleaching powder may be guaranteed by the Health Department to the general improvement of mass hygiene and sanitation.

(8) Sandstone is found both in the eastern and western parts of the province. Sheet glass manufacture has begun successfully at Bahjoi and Naini though it has been greatly handicapped by foreign competition. The Glass Industry possesses the necessary technical skill and employs roughly 1,000 hands. It is capable of producing 90,000 cases of sheet glass each year, which amounts to 60 per cent.

* Evidence of Mr. R. C. Hobart.

of the entire Indian demand. But foreign competition has proved a serious stumbling block in the development of the industry.

We consider that in a case like this, the Local Government should, for obvious reasons, press upon the Government of India the necessity for granting early an adequate protection which would establish the industry on a firm footing in this province.

(9) The United Provinces possess about 50 varieties of wood suitable for the match industry. Match manufacture should be tried and aided by technical advice and concessions from the Forest Department. On the scale of cottage production, it has failed.

(10) Among other specific industries for which we have ample raw materials or other advantages are tanneries and leather factories, hemp, soap and tobacco factories, potteries, oil and bone mills.

5. In order to plan the development of various pioneer industries, it is necessary that an industrial survey of the province should be undertaken at an early opportunity. In view of the coming Industrial Exhibition, a survey like this will be of special importance.

6. The establishment of a stock exchange at Cawnpore, as recommended by the Industrial Finance Committee, would give an impetus to the development of joint stock enterprise in industry and trade in the province.

7. But the chief feature of industrial planning would be the development of rural industries by State help through specially created services of technical advice and marketing. Many of the village and cottage industries already command larger than provincial markets; such for instance are Benares toys and lacquerwares made at Ahraura; brasswares of Moradabad and Benares; Chunar pottery; bed curtains and glass bangles of Etah; oils and *itrs* of flowers made at Ghazipur, Kanauj and Jaunpur; carpet and *durrie* weaving in Agra, Mirzapur and Jaunpur. On the other hand, there is going on a widespread process of de-industrialization, most of the handicrafts decaying and there being greater pressure on the land.

8. We cannot too strongly stress that industries, large, medium-sized or small, are the most important means of relieving the present heavy pressure on the soil and that our pace of industrialization is exceedingly tardy. Out of 23½ million workers, only about a lakh (0·5 per cent.) are now employed in organized

industries. Any system of economic planning would be futile if it disregards the important role of industries in adequate variety, number and stage of development in alleviating the pressure of population in an over-crowded tract and relieving agricultural depression.

9. The Government have followed the policy of granting loans to some major and minor industries but the results have been on the whole disappointing. The amounts of money were in many cases inadequate; control has not been properly exercised while the expert advice offered by Government has also been insufficient. Yet that this kind of shepherding might succeed in its objects is clearly indicated by the successful establishment in this province of the only sheet glass and organized catechu factories in India through loans given by Government. The United Provinces Industrial Finance Committee have recently gone into the question of financial facilities to the industries of the province. We endorse their recommendations for the establishment of an Industrial Credit Bank to give long and short-term credit to both major and minor industries. We think that as the time is most opportune the Government should take steps towards the establishment of this Industrial Banak as well as of the United Provinces Financing and Marketing Company, Ltd., as a sister institution on the lines of the recommendations of the Industrial Finance Committee. The Industrial Bank, the Financing and Marketing Company and the Co-operative Artisans' Societies helping one another might improve and develop large-scale and cottage industries of the province and increase the sale of their wares in local as well as other Indian and foreign markets. The success, however, of both these schemes must necessarily depend upon a reorganization in some measure of the Industries Department and upon the financial and technical guidance available from its personnel.

10. We urge the desirability of suitably amending the Agricultural Loans Act or passing an appropriate enactment, so that *taqavi* advances may be given directly to artisans and those engaged in minor industries on similar lines as loans to agriculturists under proper care and supervision. Such loans may be given also in the form of raw materials, implements and machinery.

11. We strongly urge that the scheme for the development of hand-loom industry in the province as recently sponsored by the Government of India should be supplemented by a more comprehensive planning to include State help to other cottage industries and handicrafts through information, education, advertisement and marketing.

12. An adequate staff of the Industries Department should embrace the following matters in a systematic planning and development of cottage industries:

(1) Arrangement for the supply of raw and semi-finished materials to cottage producers at competitive prices through co-operative artisans' societies. Where a co-operative organization among the artisans is not immediately possible, stores will have to be established in the chief industrial centres as branches of the Central Marketing Organization serving the dual purpose of the supply of raw materials and appliances where the artisans have to pay abnormally high prices for them and stocking cottage handicraft productions for sale.

The Provincial Marketing Organization working in association with the United Provinces Arts and Crafts Emporium at Lucknow, should co-ordinate and integrate the business of the chain stores in the district towns and all important industrial centres in the countryside.

The Marketing Organization established for giving facilities of supply of raw materials and marketing for all kinds of cottage production should be for the present financed through a commercial operation grant.

(2) Advising on improvement and reconstruction of processes in village and cottage industries, e.g., spinning, weaving, tanning, dyeing, basket-making, rope-making, blanket-weaving, pottery, woodwork and cutlery.

(3) The introduction and application of modern mechanical implements and tools not yet widely used in Indian cottage production, e.g., the fly-shuttle loom in weaving, gauges, improved saws, planes, tables and lathes in wood-making, punching and shape-making machines, improved moulds and lathes in metal work, improved oil-presses and cane-crushers, etc. Along with master weavers as in the recent weaving scheme some supervisors for the other arts and handicrafts will have to be appointed for two or three industrial centres, who would introduce improved methods, tools and appliances among the different kinds of artisans, get articles made according to requisite standards of craftsmanship and stamp these with marks or brands of approval. The new appliances should be lent to the artisans, preferably to those organized co-operatively, and the artisans should be induced to buy them on the hire-purchase system or otherwise.

The Principals of the chief Technical Schools should be entrusted with the tasks of supervision and improvement of industries in their special charge and undertake touring in the industrial centres to be able to deal with all the technical problems

of the industries. This is specially important for hand-loom weaving, cabinet-making and artistic wood-work, metal works, leather manufacture, glass and oil industries. We endorse the recommendations of the Industries Reorganization Committee that the heads of the principal technical schools in the province should also work as superintendents of certain specified industries for which they should take special responsibility. Similarly, the heads of the engineering schools should also work as industrial engineers dealing with the problems of industrial engineering so far as these relate to the industries in their respective areas.

(4) The introduction of improved designs which have been prepared or approved by the Arts and Crafts School, Lucknow. The school should appoint on its staff at least four artist designers for textile, furniture, metal work and pottery designing. The Government must be prepared to meet any preliminary losses due to failure of designs in the market which are intended in some measure to educate public taste.

(5) Collecting and diffusing information relating to marketing. Commercial travellers not merely for weaving but also for other arts and handicrafts should be appointed who will visit important cities and find out for which classes of goods of cottage production there are markets. They will also take samples from the Arts and Crafts Emporium and canvass for orders.

(6) In those districts where hydro-electric power has reached the villages the small artisan should be encouraged by Government to buy electric motors on the hire-purchase system either for agricultural or industrial uses. Electric motors are gradually superseding small steam and oil engines in the grid area, while certain small industries have also been established since the advent of hydro-electric power and an expansion of oil factories seems probable. In agriculture as well the electric motor for sugar-crushing, chaff-cutting, sugar centrifugals, small cotton gins and other small industries may be more quickly adopted in the countryside through the adoption of the hire-purchase system. The scale of charges of electricity have to be reduced in favour of small cottage industries using motors of 12 horse power or less and especially for those which are seasonal.

13. The Ganges Canal Grid Committee (1935) have recently reported that as a consequence of tube-well irrigation the expansion of the cultivation of cotton is expected to lead to the reopening of several cotton ginning mills in the vicinity of Chandausi which have been closed for some time. This ginning should form an important seasonal load off the peak of that due to the tube-wells. Later on a number of small spinning and weaving mills might develop, with electric drive, within the southern part of the Ganges Grid area.

14. There is considerable scope in the grid area for the use of electric power not only for cotton ginning, spinning and weaving but also for other industrial purposes such as cane-crushers, sugar centrifugals, oil extraction, flour milling, ice making, cutlery, carpentry and hand-loom weaving. In other agricultural areas where cheap hydro-electric power is available, as for instance, Mysore and Madras, the industrial load has increased gradually. In the United Provinces the development of this class of load has been, however, disappointing, the figures for 1935 being, demand 7,250 kilowatts and revenue Rs.5·43 lakhs against an estimate of 8,200 kilowatts and Rs.7·71 lakhs.

15. We endorse the suggestion of the Grid Committee (1935) as regards the institution by Government of a hire-purchase system for the purchase of electrical equipment. The experience of Madras in this connexion has been highly successful. There, as much as Rs.1,00,000 has been advanced to a single approved industrialist. No consumer has defaulted to date and all instalments are paid regularly. Another important factor in the development in Madras, if not the most important, has been an economic tariff, which may be introduced to advantage in this province on similar lines.

16. For a group of villages which are using or are likely to use electric motors for small scale industrial establishments and cottage industries, the Industries Department should maintain an electric *mistri* to look after the electric motors and advise about their repairs and maintenance. In some towns like Meerut, Hathras, Aligarh and Nagina the Industries Department might grant subsidies to smithies and repair and electric welding shops, which would go far to popularize cottage industry and small agricultural power.

17. Excellent cutlery is made in Meerut and Hathras. Aligarh is well known also for its locks and Nagina for its engraved metal work. The articles produced in such places could command wider markets if they had a better finish. The Government should be prepared to instal finishing machinery and appliances, such as a nickel-plating plant in Meerut and a small buffing, polishing, handle making and packing machinery at Hathras and Aligarh. A small calendering plant is proposed to be established by Government as an experiment at one weaving centre. The installation of finishing machinery and appliances on similar lines for the cutlery trade will give the metal trades great impetus to expand further their markets.

18. One of our witnesses, Dr. N. G. Chatterjee, has also suggested in this connexion the question of installing in suitable

places, where sheet metal work is being done (Hathras and Aligarh), small power presses with moulds for the working of sheet metal into small vessels of various sizes. Large quantities of these are being imported especially from Italy, and it may be expected that if the proper kind of workable sheet metal be supplied to cottage workers, the finished goods could be easily placed in the market at competitive rates. The same system could be adopted with advantage for various kinds of toothed wheels and shaped outer coverings as required for mechanical toys and similar objects, as also for small screws, nuts and bolts with the help of lathes.

19. In certain big grain markets like Hathras, Hapur, Meerut and Ghaziabad cleaning, threshing, husking and drying machines may be installed as an experimental measure in co-operation with the Chambers of Commerce and worked by electricity. This would contribute a great deal towards popularizing the use of efficient and labour-saving agricultural machinery in the Ganges Grid area.

20. The Department of Industries should in other industrial centres supply cheap motors to the artisans on a deferred payment system spread over a term of years.

21. Co-operative Artisans' Societies should be organized by the staff of the Industries Department as among weavers, metal workers, cabinet makers, stone-carvers, lacquer workers, artistic potters, etc. and artisans should be encouraged to buy their silk, gold or silver thread, brass or copper sheets, wood, stone or slag through the co-operative societies or through a secondary body to which the society may be affiliated. The artisans should sell their wares only through the societies.

22. New rural industries for which raw materials are available, such as grass, rush or weed, bamboo, wool, clay and pith, may be shepherded by the staff of technical experts of the Industries Department.

23. Here are openings for educated unemployed young men whose enterprise, scientific knowledge and capital resources may stand in good stead provided that the State shepherds the appropriate industries which may best be taken up by them. Watch making, as in Saxony and Switzerland, manufacture of toys of wood, metal, celluloid or rubber as in Germany, Czechoslovakia and Japan and the making of pencils as in Bavaria are suitable cottage industries which may open out avenues of employment for middle class youths in small towns and villages. Many of these industries were "created" by State aid in other countries. Such industries which depend for their success on specialized demand and

scientific training of the workers could only be built up by the educated classes.

24. Similar industries which might be taken up by the educated classes are glue making, soap making, enamelling on metals, linoleum and artificial leather manufacture, artificial silk, rubber goods, celluloid and bakelite manufacture, phenyle making, perfumery, straw and *bagasse* board manufacture, colour and distemper manufacture, and glass bulb manufacture.

25. Octroi and terminal duties levied by local bodies often have been handicaps to particular industries. Careful consideration should be given by Government to their reduction or abolition when such taxes hamper development. The schedule of tariffs and railway rates should also be adjusted to the benefit of both big and small industries. We are of opinion that there is a strong case for the protection of such handicrafts as silk weaving, toy manufacture, artistic clay-modelling and metal handicrafts against foreign competition. The increased import duty on cotton yarns is a handicap for certain kinds of hand-loom weaving. The Local Government should bring such matters to the notice of the Tariff and Railway Boards. There should also be a more appropriate machinery for dealing effectively with the freight questions under different railways in so far as these affect provincial trade and industrial development. The methods of tariff determination also might be simplified to the advantage of trade and industry.

CHAPTER IX

COMMUNICATIONS AND MARKETING

1. The total length of metalled roads in the United Provinces is 7,678 miles. The length of provincial roads in charge of the Public Works Department is 3,212 miles of which 3,194 are metalled. The District Boards, which are responsible for the maintenance of more than half the total mileage of the metalled roads, cannot look after these properly and adequately and the condition of the local roads has greatly deteriorated in recent years. Paucity of funds, lack of effective control and supervision, sudden expansion of cartage sugar-cane and the combination of iron-tyred, narrow rimmed bullock carts with fast moving motor traffic are among the factors which have led to the present unsatisfactory condition.

2. Communications from the field to the village, and from the village to the *mandi*, are often extremely poor and defective. Bad roads, lanes and *dagras* connecting villages with the markets not only add to the costs of transportation and aggravate the strain on bullocks and other pack animals, but also lead to the multiplication of small dealers and intermediaries. They also restrict markets by hindering cheap and quick movement of agricultural produce. The cart tracks in the countryside are seldom maintained in good condition for traffic. The *dagras* run zigzag often through fields, and after the rainy season may take a new course altogether. In the districts where ravines have formed the difficulty of communications is more serious and the cultivator is often at the mercy of the local grain-dealers who alone can command enough animal power to undertake the transport of produce.

3. Agricultural produce from villages finds its way to the *painths* and *mandis* on bullock and camel carts, on pack animals such as camels, ponies, buffaloes and donkeys, or on head-loads. These have come to stay because of the unsatisfactory communications. There was formerly a brisk country boat-traffic, especially along the Ganges and Jamna, Ghogra and other rivers. The river traffic has greatly declined in importance, as also the transport of agricultural produce, *bhusa*, etc. through the navigable canals. On the other hand motor transport has considerably increased in recent years, and in some districts the lorry has come to stay, carrying not merely passengers but also vegetables and fruits to distant centres which are not connected by railways. Bad roads, lack of mechanics, inadequate number of petrol depots

and service stations as well as the seasonal nature of the traffic will, however, prevent the lorry from becoming an important means of rural transport everywhere.

4. There is need of greater co-operation and co-ordination of the activities of the District Boards and the Public Works and Irrigation Departments in improving communications both from the fields to the village, and from the villages to the *mandis*. The problem of road improvement and development in the province should be a part of a planned regional programme of road construction. The re-formation of the Provincial Board of Communications into a Board of Communications and Marketing seems to us necessary for the realization of this object. All proposals for the construction of new roads and bridges, allocation of the road development fund, road regulations as well as regulation of markets, freights, tolls and octroi duties and co-ordination of the various interests and activities connected with marketing generally should be referred to this Board for consideration and suggestions. For taking up a planned scheme of development of communications, the province might advantageously be divided into four zones :

(*a*) Areas where cane is cultivated extensively.

(*b*) Wheat-growing areas.

(*c*) & (*d*) The less productive areas which may be classified according to land revenue returns. These areas may be taken up successively for road development.

5. It is desirable now to give relief to the District Boards, re-classify the metalled roads and provincialize all roads which are arterial, establishing connexion between the districts and between this province and other provinces. A classification was made for this purpose by Sir Ivo Elliot in 1927 and this should now be reconsidered. In some cases the Government may give grants-in-aid to District Boards towards the cost of maintenance. In such cases the supervision of roads should be entrusted to the Public Works Department.

6. It is also necessary to consider whether District Boards may by statute be required to spend a fixed proportion of their income on roads. At present great disparity exists between the importance attached by different District Boards to road maintenance. The major portion of the income derived from the motor vehicles tax and of the Government of India grant from the Road Development Fund should go to the District Boards. One witness suggests that the District Boards may also be authorized to levy a tax on certain types of village carts, especially those that ply for hire during the cane season.* What co-operation between the Irrigation Department and District Boards could achieve is shown

*Evidence of Mr. R. N. Dey.

by the building of the Daurala sugarcane tramway in Meerut and the construction of eight bridges, either completed or in process of building, by the Irrigation Branch for the District Boards in Meerut, Muzaffarnagar, Saharanpur and Gonda. Such improvement of communications and transport would not only safeguard irrigation revenues, especially in cane areas, remote from the main railway lines and roads, but would react favourably on agricultural marketing as a whole.

7. In the Sarda Canal zone, intersected as it is by deep perennial *nalas*, the improvement of communications by bridging rivers on local roads by the Irrigation Department was suggested by Mr. Richardson. The Irrigation Department which helps the cultivator to sow cane and improve the quality and outturn of his other crops could stabilize and expand its revenues by shouldering in some measure the burden of road improvement in outlying areas where defective communications hinder marketing, compelling, for instance, the cane grower to turn cane into *gur* or sell it at unremunerative prices where the cost of transport to *mandis* and factories is prohibitive.

8. The Provincial Board of Communications and Marketing and the District Development Boards should bring about a more intimate touch between the Public Works and Irrigation Departments for the opening up of outlying cultivated areas by means of roads and bridges.

9. We suggest the consideration of a Highway Act for the province which should limit the gross weight and wheel pressure per inch width on metalled roads. The question of fixing minimum limits to the width of iron tyres which do great damage to the metalled roads is rather urgent.

10. Several witnesses have stressed that a great reduction in the cost of maintenance would be achieved if roads were divided into different tracks for carts and for other vehicles. A cart can go as easily on the *patri* as on the metal, but it does incomparable damage to the latter and thereby increases the cost of maintenance. All metalled roads may be widened to allow on each side a *kachcha* one-way track for carts. To this track carts may be confined by law which is not difficult as the success of the car-cart bifurcated road in the districts of Gorakhpur and Basti has amply shown.

11. For unmetalled District Board main roads the car-cart bifurcation which obtains in Gorakhpur and Basti could be generally enforced over the province. Usually according to the *gola* system, one-third of the road is kept for light traffic and two-thirds for heavy cart traffic. A ridge or ditch is maintained

between the portions and cartmen are liable to prosecution for breach of rules. As a result of this decision, the unmetalled roads are often better than the metalled roads in the two districts.

12. Recently the Dunlop Rubber Company, India, have brought out pneumatic tyres for bullock carts. Tests indicate that double loads may be taken together with 25 per cent. increase in speed by the use of these tyres and besides enormous sums may be saved in road upkeep. Some countries are considering subsidy schemes in various forms to facilitate the change over to the new type of wheel.

13. In several towns in India country carts fitted with pneumatic tyres have been exempted from the payment of the wheel and the toll tax. It may be mentioned that Japan has already made a considerable progress in the adoption of pneumatic equipment which has become general in certain areas. The Public Works Department, Municipalities and District Boards should encourage all contractors to adopt the pneumatic wheel equipment for bullock carts and the possibilities of the hire-purchase system in regard to the introduction of its use should be explored.

14. Village roads which receive at present no attention from the District Boards would be better looked after by the *panchayats*. All cart owners may be required by such *panchayats* to pay a wheel tax of about 8 annas or should give instead a week's labour a year for works on these roads. In villages in South India communal labour contributes a great deal towards the maintenance of village roads and lanes. Village tracks are often encroached upon by the cultivators' fields. The intervention of Collectors and subordinate officers is necessary for insistence on the maintenance of roadways as shown in Settlement maps.

15. For affording encouragement to the development of motor transport we urge that monopolies may be granted by public auction for limited periods, say, five years, the rates, timings and number of vehicles being fixed in advance. This would assure a larger income, afford greater convenience in travelling and eliminate cut-throat competition which is uneconomic and generally results in putting dangerous and unsuitable vehicles on the road. Motor companies may be induced to undertake to develop new routes, maintaining and opening new roads where necessary, by being granted monopolies for longer periods.

16. Light railways or tramways have been found economically important and successful where the produce to be moved is heavy and bulky and the period of movement not too short. But we do

not adequately profit by the experience of other parts of India. These offer a valuable solution to the problem of road deterioration especially in the cane areas where roads cannot carry the present heavy traffic. Tramways serving the cane areas could be constructed by loans from funds earmarked for the development of the sugar industry. The Commissioner of the Gorakhpur Division showed to us some schemes of light railways which he has been advocating to the sugar factories, as for instance, Sardar Nagar to Kasia through Domariaganj, Gorakhpur to Maharajganj, Basti to Tulsipur, Gouribazar to Rudrapur, etc. Similarly in the Ganges doab Sir William Stampe referred to certain light railway projects as, for instance, Newari-Begamabad, Daurala-Meerut, Jansat-Mansoorpur and Shamli-Muzaffarnagar. We understand that some sugar factories are even prepared to guarantee minimum interest charges to Government for construction of tramways in their cane areas. With such a guarantee the tramway extensions should be taken up by Government without delay.

17. The Daurala tramway road which has been recently completed taps an area of 1,400 acres of sugarcane and is able to transport 105,000 tons of sugarcane during the season at half a pie per maund per mile, which is less than half the cost of bullock transport. In the district of Dehra Dun a light railway in Eastern Doon which has a sugar factory and extensive cultivation of sugarcane would generally open up the economic resources of this tract. Similarly a light railway between Beer Kheri and Nauta and the submontane tracts of Saharanpur is commended. The District Officer of Muttra has adduced evidence that a light railway would probably be remunerative in this district between Muttra and Goverdhan, Muttra and Baldeo, and Raya and Mat.

18. For a fuller exploitation of forest resources and increase of revenue, tramway extension may play an important part. But such light railways or tramways could only be opened in the hill tracts and the Terai forest belt of the submontane districts in connexion with special industrial undertakings which have to obtain raw materials from a wide area for a considerable portion of the year, as, for instance, at Haldwani.

19. Near most of the larger towns of the province there are brick kilns which send loads of bricks and ruin roads by overloading and abuse. It has been suggested by one witness that where kilns are situated at distances up to 5 or 8 miles from a city light tramways should be laid and expenses recovered by freight receipts per horse or bullock-drawn truck and the road haulage of trucks be forbidden in such cases.*

*Evidence of Mr. H. R. Saloway.

20. The problem of road deterioration in cane areas may also be partly solved if Government assists towards the installation of aerial ropeways for the transport of cane to the factories. The Government may help the sugar factories in the acquisition of land of a few collecting stations within a 10-mile radius of the factories which will be connected with such stations by ropeways.

21. Cane cultivation has focussed the importance not merely of the problem of unsatisfactory roads and transport but also of marketing methods. We urge the Government to push forward the full scheme of cane development and marketing and enlist the co-operation of the sugar factories in this connexion in as many areas as possible. In the meanwhile propaganda for the formation of better farming and better living societies may be taken in hand in these areas. In other tracts also co-operative marketing of sugarcane which has offered great facilities of sale to the cultivator and improvement of the standard of cultivation should be extended.

22. As regards the work which may be taken up in connexion with agricultural marketing in general, the following may be stressed :

(1) Standardization of the weights (on the basis of the Bengal maund of 40 seers, each seer being 80 tolas) and measures of the province by legislation. To check fraudulent practices, the question of licensing dealers who trade in all commercial crops may be considered on the same footing as the licensing of sugarcane contractors.

(2) Establishment of licensed warehouses as an experimental measure in markets like Hapur, Ghaziabad and Meerut with the co-operation of the Chambers of Commerce and under Government inspection with reference to adulteration, grading and management in general.

(3) Establishment of regulated markets as an experimental measure at such centres as Hapur and Ghaziabad on the lines of the recommendation of the Central Banking Enquiry Committee with the co-operation of the local Chambers of Commerce. Markets for separate commodities would not be suitable and what are wanted are general regulated markets. The initial expenditure on land and warehouses should be met by Government while the staff of the Agricultural Department should assist the Marketing Committee in the matter of grading produce.

(4) Survey of cereal stocks in all important *mandis* of the province, of local marketing charges and practices, as well as of transport costs per cart-load and mile in the area.

(5) Survey of the possibilities of finding outside markets for hemp, fruits, oil seeds and other specialized produce.

(6) Establishment of market committees at suitable centres to deal with cases of fraudulent weighments, unauthorized deductions and other illegitimate practices.

(7) Issue of market bulletins and supply to all *mandis* of information about outside markets and the prevailing prices.

(8) Grading of wheat, cotton and hemp by the field staff of the Agricultural Department.

(9) Improvement of present methods of storing grain so as to prevent loss from insects, rats or underground damp.

CHAPTER X

Rural sanitation and medical care

1. Outside the few towns where Improvement Trusts exist, adequate attention is not paid to the prevention of congestion. In many towns there is inadequate provision for playgrounds and parks for men, women and children. Where Improvement Trusts do not exist the District Magistrate and Public Health officers should have authority to direct the Municipal Boards to carry out schemes of town and house improvement. The poorer classes build houses as they like and when they are short of accommodation they further try to cover every inch of open available space. The only way in which proper quarters for the poorer classes can be arranged is that the Municipal Boards and Improvement Trusts should acquire the mohalla which is insanitary and rebuild houses on sanitary lines and sell them at cost price to those who have been dishoused. Grants or loans may be given to the Municipalities concerned for such purposes. In most towns there are dilapidated buildings and houses in ruins which may be acquired at a small cost. Such areas will function as lungs for the lanes and bye-lanes and provide for the recreation of the women and children of the locality.

2. The existing open spaces on the confines of the city *mohallas* may also be reserved for providing parks and playgrounds. If Municipal Boards cannot or do not wish to open up congested areas they should at least keep the thoroughfares open. They do not take much notice of encroachments on public roads. Thus the *patris* remain blocked. The existing municipal bye-laws relating to roads and buildings are inadequate and what is more, those in existence seem to be honoured more in the breach than in the observance and the members hardly exercise proper control for their enforcement. Co-operative Housing Societies should be formed and may be encouraged by Municipalities to provide housing of the lower middle classes. Every urban area should also have a scheme of town planning, conformity to which should be secured by all new constructions and developments subject to the sanction of the Public Health Department or the District Officer. The following improvements and amendments of bye-laws appear to be necessary :

(*i*) Definition of "material alterations" to buildings to prevent growth of factories in residential areas.

(*ii*) More precise bye-laws to prevent over-building in civil lines and to provide more commodious, open and airy houses for workmen.

(*iii*) Certain changes in the bye-laws so as to check cutting up of one residential house in the city into several tenements.

(*iv*) Powers whereby to prevent one house owner acting adversely on the other.

(*v*) Changes in the bye-laws so as to check the growth of wells, temples and mosques, and to enforce better designs of latrines and drains.

3. Most villages of the United Provinces have swelled in size, due to increase of population, without regard to any scheme or plan. When cattle and cattle owners do not live apart from each other, the increase of bovine population aggravates the effects of congestion. An increase of economic pressure which keeps the members of the family together, the levy of *nazrana* which prevents the extension of house sites and the social prejudice which prevents the depressed castes in particular from obtaining sites for new hamlets have conspired to produce congestion which is appalling in some parts of Oudh and the eastern districts of the United Provinces. Here we often find huts thickly massed at all angles in the congested village sites, without light and air. Even cattle and goats are packed together with men, women, and children and there is little decency or privacy. Sometimes the older men have to sleep outside under the trees or erect temporary sheds near the fields.

4. Mr. Drake-Brockman observes, "The landlord will ordinarily not allow any growth of the *abadi*, at once ejecting the tenant who builds any erection on any field in his holding or on any one else's holding. For purposes of expansion inhabitants have to found *purwas*. These are necessarily situated on uncultivated land, usually unhealthy *baghs* or barren shadeless bits of *usar*."

5. That the levy of *nazrana* by the *zamindar*, which amounted in one village, which we visited, to Rs.25 for a small extension of hut, is a handicap to expansion in the face of increasing numbers in the family has been stressed by several witnesses. One of them has suggested legislation to help tenants to obtain larger sites for their huts on the payment of such compensation to the *zamindar* as is within their means. Consolidation of holdings will probably split up old settlements and give rise to some quite detached hamlets or homesteads, thus relieving congestion. Legislation in some form or other to allow of the acquisition of land for the expansion of the village site and for the construction

of isolated houses on any of its lands must be considered necessary to deal with a question of such vital importance. We urge that consideration should be given to the amendment of the Tenancy Acts so as to provide facilities to tenants for acquisition of house-sites on payment of a reasonable premium to the landlord.

6. Whenever a village is completely destroyed by fire or otherwise, efforts should be made to rebuild it on approved lines.

7. Existing medical facilities in rural areas are very inadequate for both ordinary and epidemic diseases. It has been stressed by more than one witness that we should aim at building more fixed dispensaries in every district so that ultimately each of them commands a radius of about 5 miles. At present travelling dispensaries number only 23 in the whole province. These are quite ineffective in dealing with epidemics which usually affect a large number of villages simultaneously and cannot undertake even the usual curative work. In Czechoslovakia where the health conditions in the villages are not superior to those prevalent in this province, a system of subsidy to village medical officers in self-supporting Health Unit circles, who may charge small fees from the patients, has contributed a great deal towards the treatment of diseases and improvement of sanitation. In Bengal a similar scheme of a self-supporting dispensary for a circle of five villages is proposed to be instituted. But till such time as fixed dispensaries could be multiplied sufficiently Government travelling dispensaries are a necessity and there should be at least one such dispensary in each district which will deal with epidemics as well as treat diseases in the rural areas. We are convinced that the masses in India have to be taught that efficient medical service is to be paid for before hospitals and dispensaries can multiply to the extent that is sadly needed in order to eliminate the vast preventible mortality in the country.

8. Teachers in District Board schools and village guides should be trained by the Health staff and the doctors attached to travelling dispensaries, so that they can render first aid and administer such simple remedies as quinine for malaria and iodine for cuts and also take precautionary measures in cases of epidemics. At Ting Hsien in China the rural health programme of the mass education movement is carried out in the following manner:

> Beginning with the local village, capable literate young men have been selected and given a 10-day course in first aid, medicine, and sanitation, after which each is given a box containing simple drugs, vaccine for smallpox and first aid appliances. These men keep records of births and deaths, look after wells and general sanitation and take

care of the simpler cases of illness or accident. They belong to the People's School Alumni Association of the villages and receive regular supervision from the physician of the Sub-District Health Station, which is equipped to take care of the more serious cases. The District Health Centre covers the entire region, having a hospital, a laboratory as well as the administrative offices and class-rooms.

9. Indigenous *dais* should be induced with stipends of Rs.8 or Rs. 10 per mensem each to obtain training for a few months in a neighbouring town which has a hospital for women. The number of trained midwives in the rural areas has to be increased very considerably. Such trained *dais* could in their turn train *dais* in their own *tahsils*. District Boards should frame by-laws under the District Boards Act for the registration of midwives when an adequate number of trained *dais* are available.

10. Improvement in rural housing should be taken up in circles of 15 villages under the supervision of the resident organizer and the *panchayats* along these lines :

(1) Replacement of thatched roofs by tiles.

(2) Addition of short verandahs in front of cottages and provision of windows.

(3) Building of separate cow-sheds or out-houses for animals.

(4) Extension of congested village sites.

(5) Planning of village streets and lanes with reference to the important public buildings and village meeting places.

11. Rural sanitary improvement must begin along these lines :

(1) The digging of manure pits by the villagers on the fields at a distance of at least 200 yards from the *abadi*.

(2) Use of such manure pits as latrines and the regular removal of household sweepings, cowdung heaps and feeding residues of all kinds to these pits. The making of compost from all kinds of waste vegetable matter, wood ashes, urine earth, cowdung and human excreta should be taught and popularized.

(3) Provision of soakage pits for waste water.

(4) The field latrine should be kept at a distance of at least 300 yards from the *abadi*. In the selected area demonstrations as well as direct propaganda must be directed by the sanitary staff towards the above objects. Health weeks, baby shows and home visiting should be organized.

(5) A vigorous campaign should be launched against rats; rat medicine should be freely distributed and local rat-killers should be trained for the area.

(6) A campaign for inoculation, vaccination, use of soap and phenyle and mass quininization (in the eastern districts) should also be undertaken.

(7) The provision of latrines and bathing places especially for women and children. Absence of privacy often leads to the omission of bathing, which is a pastime of women in Bengal with her innumerable shady tanks, rivers and minor streams.

(8) The throwing open of all wells built out of public funds to every one regardless of caste and creed. In most districts large sections have to obtain drinking water from wells which are in an unsatisfactory condition or are positively insanitary and in several districts members of the depressed castes have neither wells of their own nor are allowed to draw water from village wells. All wells should be parapeted, cleaned periodically and permanganated when necessary. Drinking water is very poor in villages in the Tarai and Bhabar; while in the arid and ravine stricken tracts there is an actual scarcity of drinking water supply.

(9) Maternity and child-welfare work should be taken up in the villages, and village midwives should be trained for the area. Some members of the committee and several important witnesses strongly hold that the child-welfare movement should definitely adopt as one of its principal objects the broadcasting of practical knowledge about the use of contraceptives. Where child-welfare centres have been started, these could easily become birth-control clinics. Population in the United Provinces is increasing much faster than the cultivated area, the total outturn from the land and the facilities for primary instruction and mass sanitation. The outlets of migration have been choked by the present industrial depression and the progress of industrialization also is exceedingly slow. The movement of rural reconstruction or as a matter of fact any programme of economic uplift and social welfare is bound to fail in its objects if in the meanwhile a rapid multiplication leads to an all-round lowering of social standards. It is time that both Government and people realize the gravity of the population question in the province and no longer fight shy of a policy of population restriction.

12. We have to look to the village *panchayat* as the effective link between the activities of the Public Health Department and the villagers. The present position seems to be anomalous. The sections in the Sanitation Act regarding cleanliness have all been repealed with the result that the Act refers merely to keeping wells clean. The reason for this repealing probably is that District Boards have the power to frame by-laws in order to secure general cleanliness, such as pitting rubbish outside the *abadi*. First of all, several District Boards have not yet framed such by-laws, and secondly, even in the districts in which they have the *panchayats* cannot take cognizance of breaches of these by-laws. The result is that even where by-laws exist, they are a dead letter. It is not possible to secure wide-spread sanitary rural improvement unless *panchayats* are armed with legal powers both to take cognizance of and try breaches of by-laws, with suitable checks, such as obtaining the sanction of the S. D. O. or the Tahsildar before cases are instituted.*

13. Further a similar method has to be devised of acquiring land more easily than under the present Land Acquisition Act for pitting manures at a reasonable distance from the *abadi*. Even if the villagers agree to pitting the manure the difficulty in securing land often has to be faced. The *panchayats* should be authorized to deal with such a matter and pay reasonable compensation to *zamindars* and tenants for such land out of their funds.

14. In no ways could the *panchayat* more easily effect rural uplift than by inculcating and enforcing rules of hygiene and sanitation, purification and improvement of water supply, segregation in cases of epidemics and generally by creating amongst the villagers a new sanitary conscience.

* Evidence of Mr. R. N. Dey.

CHAPTER XI

Co-operation

1. The spearhead of economic offensive in the village must be the co-operative movement. Any lasting form of rural uplift rests on the collective spirit and co-operative endeavour applied to every phase in the social and economic life. Everything can be brought under the sphere of co-operation from afforestation, irrigation and pasture management through credit and sale, to the improvement of agriculture, live-stock, public health and living conditions.

2. No doubt the co-operative movement had had more reverses and succeeded much less in the United Provinces than in some other provinces. It will, however, be less profitable to decry the lack of thrift, education and business methods among the cultivators than to understand the special limitations of the co-operative movement in this province. Holdings and hence the resources of the cultivators are much smaller in this province than in other provinces, nearly half of them cultivating under-sized holdings which can never be debt free. Droughts are more recurrent here than in most parts of India; once in six years on an average a famine or scarcity of food-grains and fodder sweeps away the entire capital of the small holder. The absence of occupancy status of a considerable portion of the tenants abridges credit. Life tenancy is not compatible with permanent improvements of land by the cultivators on which alone could rest agricultural security and an adequate agricultural surplus. The chief reason why unproductive debts bulk largely in the tenant's indebtedness is that for a quarter of the holdings in Agra and for about 70 per cent. of the area in Oudh, the land tenure limits opportunities of productive investment of capital in the land. Thus the cultivator is caught in a vicious circle, unproductive borrowing and expenditure still more restricting credit and increasing his debts. The grant of occupancy status to the tenant will improve credit, raise the standard of farming and increase land values and thus be to the ultimate interest of the *zamindars*. Co-operative societies, land mortgage banks as well as Government through advances of *taqavi* loans might help the tenants to purchase occupancy rights.

3. The cumulative increase of the burden of indebtedness restricts agricultural opportunities and saps moral incentives to an extent which in the end defies ordinary means and demands more

drastic action than contemplated before. According to the departmental rules co-operative societies cannot lend members enough money to pay off pre-membership debts, the burden of which acts as a drag on the co-operative credit movement. Debt Redemption Societies, if properly worked, could afford a certain measure of relief in releasing cultivators from pre-membership loans and thus eliminating the chief source of piracy on the movement and finally in gradually abolishing all unproductive debts.

4. Even this would not suffice and land mortgage banks must be established sooner or later to provide long-term credit. Necessary legislation should be undertaken for permitting ex-proprietary and occupancy tenants to mortgage their holdings to land mortgage societies for a period of 20 years, the latter having the right to sublet them.

5. There is a scheme before the Government for the establishment of a Provincial Land Mortgage Bank. The Government should now take steps towards the establishment of such a bank, guarantee a minimum dividend of 3½ per cent. on the share capital, take up any unsubscribed portion of the share capital and guarantee interest on all debentures. This will speed up the organization of district mortgage societies in the rural areas which must fill the gap in credit caused by the recent debt relief legislation.

6. Yet even with the facilities of long-term credit given to small proprietors and tenants by land mortgage societies a considerable proportion of the unproductive debt of the cultivators cannot be wiped out. It is time that careful consideration should be given to the question whether co-operation in view of the considerable proportion of unproductive debt of the cultivators can solve the problem of agricultural indebtedness or that there should be some other method or machinery supplementary to it to reduce the burden of debts.

7. The Co-operative Department should be prepared as an experimental measure to advance money to creditors for part of the debt due to them by the debtors and to assign to creditors bonds guaranteed by it for the balance of the debt. The money so advanced and the amount of the bonds may be secured on the debtor's lands, rents or revenues. A portion of the debt has to be wiped off after a detailed investigation into the history of each case by a village tribunal in which Government revenue officers should be adequately represented. The tribunal would award a figure which shall not exceed a certain multiple of the rent and revenue. This will not prejudicially affect the creditors who now find that most of their debts are irrecoverable.

8. Debt Conciliation Boards should be started as in the Central Provinces and as provided in the Act recently passed in Madras and these should take up each individual case for a fair adjustment of claims between creditors and debtors in the period of falling prices. The amount finally settled may be paid to the creditor by the co-operative societies, land mortgage banks or by the Government as is now being done in Madras under the Agricultural Loans Act (amended) under the provisions of which special officers are appointed to bring about debt settlement and pay off the creditors. The maximum amount thus loaned to a debtor cultivator is fixed in Madras at Rs.2,000, in each case, the Government charging interest at the rate of 5½ per cent. We understand that a portion of the funds of the Government of India available for rural development has been utilized for the formation of Debt Conciliation Boards in the Central Provinces.

9. With this preliminary drive against agricultural indebtedness a fillip to the co-operative organization may be given along the following directions:

> Better living and better farming should precede or at least be started along with credit societies. Co-operative Societies must take up agricultural improvement, prevention of litigation, thrift, cattle improvement and rural reconstruction work generally in order to develop the right co-operative spirit among the cultivators. The cultivator has to be convinced that it will pay him in the long run to not only become a member of a co-operative society but also work with others as a team. It is because the co-operative movement has not been linked strongly and intimately with rural reconstruction that it has not taken firm roots in the village.
>
> On the other hand, whatever advantages the cultivators have received by way of cheaper credit have not been consolidated into permanent gains either in the form of a higher standard of living or a better method of cultivation. Neither the burden of indebtedness nor the rates of interest have been reduced appreciably as in some other provinces. Any future, therefore, for the movement must be based on the shift of emphasis from credit to the improvement of farming standards and the use of co-operation for the purpose of economic uplift collectively sought and obtained.

10. In our present scheme the co-ordination of the developmental activities of the Government and the use of the co-operative organization as the chief lever of rural uplift would, on the one hand, dispel the idea from the villager's mind that co-operation

is only a credit machinery and on the other elicit team work in the village which would assure the success of all other reconstruction activities.

11. A practical step towards unifying co-operative work with other developmental activities would be to appoint *panchayats* in the villages where co-operative societies exist entirely from the members of such societies. Such a *panchayat* would be more dependable than the society or the supervisor for controlling the expenditure of loans advanced by the co-operative banks and restricting their application to the purposes specified. Loans should be given in kind more usually than at present. Where the cultivator asks for a loan for seed, for instance, he should be supplied seed through the seed store of the village; where he asks for a loan for cattle, the co-operative society should instead of giving him cash obtain his cattle for him through the Agricultural Department or other suitable agency.

The society could obtain seeds and bullocks cheaply if the demands for the whole village could be pooled. It is in this manner that a genuine co-operation could develop, lightening the emphasis on lending and borrowing cash and directing co-operative credit definitely in the direction of economic amelioration of the villagers towards which different Government departments, and not merely the co-operative, co-ordinate their activities on the spot. The most effective method of curtailing unproductive expenditure of loans from the societies would be to shift the moral responsibility from the individual to the *panchayat* whose opinion will count towards inculcating thrift.

12. Establishment of co-operative societies for the purchase of agricultural requisites and the sale of agricultural produce. Facilities of sale of agricultural produce should be regarded as one of the chief remedies for the ills of credit co-operation, but so far there has been little development of co-operative marketing. Co-operative sale societies should be formed especially for the disposal of commercial crops functioning as commission shops in the Punjab or as loan and sale societies in Madras. Cane marketing societies and boards have done most promising work and come to stay in the province indicating the possibilities in this direction.

There should be much closer linking of the activities of the Marketing Officer and the staff of the Co-operative Department as regards the establishment of co-operative supply societies for produce other than sugarcane and linking such societies with the outside market.

13. Gradually as the *panchayat* becomes the lever of team work in the villages the harnessing of co-operation to meet the collective needs of pasture management and afforestation, ravine and sand reclamation, irrigation and embankment, purchase, sale and store, adult instruction and jungle clearance will come. The *panchayat* and the co-operative society will thus be merged in one. Co-operation can become a popular movement in the villages only when it becomes assimilated to the ancient social tissue. It is this which explains the success of the Japanese Hotokushas and Mujins and the Russian Artels both of which spread far and wide in the course of only a few years. As a part of the social texture of the village, co-operation will show its full potentialities for the uplift of the masses. Dissociated from it, it becomes a mere money-lending and money-collecting device and that a harsh one, dividing rather than uniting the villagers, so that one could say today that 'co-operation in any form is foreign to oriental thought which appears to be mainly ego-centric'.*

14. As in other fields of rural uplift contacts with the village or the farmers should be established not only by direct propaganda of the field staff of the Co-operative Department but also by their direct participation in the social life of the people. The village has to be converted from a collection of small holdings to a single big farm and agriculture is to be treated as a collective service. The co-operative organization is one of the weakest spots in the rural economy of the United Provinces and debility in the spine and lumber region has meant an all-round weakness. Special field staff must be mobilized for this purpose in order that the whole campaign may not be weakened.

15. Another important factor responsible for the weakness of the co-operative movement in the province is the lack of a central co-ordinating agency like the Provincial Co-operative Bank. We urge that Government should take early steps to set up such a bank on the lines suggested by the United Provinces Banking Inquiry Committee to function as the central financing and balancing institution. Its establishment will contribute towards (i) an adequate control over deposits in the central banks by a regulation of the rates of interest (ii) avoidance of excessive profits by central banks incommensurate with their working capital, (iii) checking unco-operative investment of their idle balances and (iv) a general expansion of the credit movement on sound business lines through central direction and co-ordination so necessary to safeguard the financial stability of the central banks.

16. The Provincial Co-operative Bank will contribute towards the re-organization and consolidation of the co-operative movement and establish the much needed contact with joint stock

* Evidence of Mr. W. F. G. Browne.

banking and the Reserve Bank of India. It will be a complementary institution side by side with the Provincial Land Mortgage Bank so as to systematize both long and short-term aspects of the credit movement. The present conditions of the money market in India are in favour of establishing both these institutions.

17. Since the Co-operative Department is being increasingly utilized for the training for rural uplift work a unified and systematic training in the theory and practice of agriculture and co-operation along with courses in rural sanitation and hygiene, improvement of village planning and housing, adult instruction and recreation, thrift and temperance work, organization of village clubs, scouting, etc. must be evolved and the staff of teachers at Partabgarh, Benares, Fyzabad and Bulandshahr should be considerably improved with an eye towards fashioning each worker, whether a resident organizer of the new Rural Development Scheme or the ancient *patwari* or the teacher of the village school, as the Socrates of the United Provinces village. In each centre there should also be a department for training women workers for whom an appropriate syllabus must include maternity and child-welfare work, thrift, home treatment of common diseases and elements of personal hygiene and cleanliness.

18. Consideration should be given whether the time is ripe for the establishment of a Central Institute of Training for Rural Development at Lucknow where the assistance from the University which offers post-graduate courses in Agricultural Economics, Land Tenure, Co-operation and Population, could easily be obtained, such association helping towards the recruitment of University students trained in rural reconstruction for honorary work.

CHAPTER XII

Removal of illiteracy

1. The programme of making about 50 lakhs of boys and girls between the ages of 6 and 11 literate through the establishment of schools involves difficulties of staffing, organization and finances which will delay the expansion of education more than we now anticipate. On an assumption that there is one lakh of increased enrolment in the schools per annum, it will take 15 to 20 years for all the boys of this province to be brought into schools with an estimated cost of about Rs.$2\frac{3}{4}$ crores recurring, and Rs.$8\frac{1}{4}$ crores non-recurring.

2. As regards girls amongst whom the illiterates number about 28 lakhs, the difficulties of expansion arising from larger expenditure on staffing, etc. have been found to be far more serious.

3. The fact that compulsion has been adopted by only 36 out of 85 Municipalities and 25 out of 48 District Boards also indicates certain difficulties, which are particularly great in District Board areas.

4. The task of removing the illiteracy of 50 lakhs of children is a tremendous one. Our agricultural conditions and circumstances, dominated as they are by the uncertainties of rainfall, necessitate the employment of a certain number of boys and girls for lighter field-work during certain brisk seasons, such as weeding, keeping watch, mending watercourses and doing odd jobs. A large number of children is also employed in herding and grazing cattle, sheep and goats. In certain tracts the adoption of compulsion will be delayed on account of the necessities of agriculture. There will also be seasonal absenteeism in the Terai due to fevers, while in the ravine and hill tracts difficulties of attendance during rains will not be easy to surmount under the existing system of communications. Further, the low density of population in Bundelkhand and certain arid areas will raise the expenditure of schooling and supervision per unit, and thus both natural and population factors will upset the estimates of the expenditure on education and the output of literates.

5. Between 1881 and 1931, population in the United Provinces has increased by about 10 per cent. We can assume on this basis, that between 1920 and 1950 (the terminal years of the Education Department scheme of removal of illiteracy) there is likely to be an increase amounting to at least 4 per cent. of the

total population or an addition of about 18 lakhs of persons to the number of school-going children, which should be calculated in anticipation of this increase and not on the basis of the existing number.

6. Another factor in the expansion of education which must be considered in the scheme of the establishment of new schools is the housing of teachers in the rural areas. It is not seldom that in villages, where lack of adequate number of houses is already a serious problem, want of accommodation leads to desertion amongst school teachers. The towns have, indeed, a great advantage as regards the facilities available for cheap and sanitary housing. Again, the towns offer supplementary sources of income as well as opportunities of recreation and social life. Teachers in outlying villages, again, do not now accept the routine of rural life happily. The scheme should therefore be framed in such manner as to permit easy transfer from village to village, and from village to city, which would also have its own educative value. This will particularly be true of women teachers in girls' schools.

7. A big scheme of expenditure for primary education will ultimately have to depend upon some form of provincial tax or cess, and it must of necessity be of the nature of a plan for at least five years at the outset. No accurate estimates of revenue and expenditure can be prepared at the present stage of development. Capital expenditure on buildings or permanent commitments for appointing supervising staff, etc. should be avoided as far as possible. Uneconomical and superfluous schools also have to be shifted to more suitable centres. There should not be any great loss due to expenditure on building schools and teachers' houses in localities which later on may have to be abandoned. On the basis of 7 square miles to a school (serving a circle with a radius of $1\frac{1}{2}$ miles—a distance which a boy of six years could easily walk) we need in this province some 14,000 schools. But our primary schools number about 18,000. The over-crowding of schools is manifest. As in so many other fields we have sacrificed quality to quantity.

8. The dual problem is to get rid of hundreds of superfluous primary schools on the one hand, and to increase the efficiency of those which are maintained by improving accommodation, equipment and the number and training of teachers. The school environment has to be enormously improved and accommodation increased everywhere and especially within the compulsory areas. In some there is no building and the children work partly in a verandah lent to them and partly in the village street. Attendance will greatly improve if a happy environment awaits the children at school. Many schools are also in need of the ordinary instru-

ments of instruction, while there is a great disproportion in numbers and training of the staff in various schools. Compulsion has not yielded satisfactory results largely because of unattractive schools, inadequate number and training of teachers and lack of materials and furniture for educational purposes. These defects have to be overcome by financial co-operation between the Education Department and the District Boards and day-to-day co-operation between the school committees and the inspecting staff; while both the hours of school work and holidays should be more carefully adjusted to the agricultural routine than at present.

9. Compulsory attendance without compulsory enrolment would greatly reduce the present waste and inefficiency, for much of the enrolment in the infant classes, which keeps going hundreds of useless schools, is nugatory. Whether the Acts under which compulsory primary education is enforced in Municipalities and in District Boards, should be amended so as to empower boards to introduce compulsory attendance deserves careful consideration. In all rural reconstruction centres the system of compulsory attendance should be introduced. In a province where population is increasing much faster than the facilities of building, staff and funds, compulsory attendance will prevent casual admission and withdrawal of pupils, eliminating waste of money and personnel.

10. The principle of compulsion for 4, 6 or 8 years' primary instruction cannot be introduced all at once. European countries have mostly 7 or 8 years' primary instruction; England 9 years; Soviet Russia at present allows for only 4 years' primary instruction but will soon pass to a 7-year system. Similarly, China has a 4-year course but hopes to introduce a 6-year course for all pupils later on * We have ultimately to adopt a longer period than a 4 years' course of primary instruction as our minimum. But the plan to provide even 4 years' instruction is but imperfectly realized in India.

11. In the municipal areas compulsory attendance for four years should be extended first and every effort should be made to bring into the scheme the recalcitrant municipalities. If townsmen have sometimes shown themselves averse, villagers are bound to be indifferent, if not suspicious and even hostile. Peasant habits and attitudes take time to adjust themselves and sheer poverty of an extreme type such as want of clothes prevents children from attending school. Again, there may be full enrolment but the flight from education before that education has hardly commenced

* The Reorganization of Education in China : Report of the League of Nations' Institute of Intellectual Co-operation.

will be more marked and to some extent nullify the effects of compulsion.

12. From Mr. R. S. Weir's report in 1934 we learn that of 25 boys who enter primary schools in this province five only reach class IV and of these five, only one does so in due time. It is essential to get all pupils to read up to class IV for unless a primary course of 4 years is completed, permanent literacy cannot be achieved under the present educational system. Out of about 12½ lakhs of students only 90,000 are to be found in a year in class IV. Thus money is being expended for which there is a disproportionately small return. Mr. Weir strikingly observes, "A motor car which consistently failed to function on three out of its six cylinders would either be relegated to the scrap heap or sent for overhaul. Yet our educational system is in no better plight." The few students who achieve literacy do so at a high cost : Rs.120 per annum each or more than the annual income of an ordinary household in the United Provinces. Compulsion raises the cost of primary education of an ordinary boy from Rs. 8 to Rs. 10 or Rs. 11 and the scheme moreover is not so far producing in the allotted space of five years anything like the percentage of literates hoped for. Taking the figures of 20 municipalities and 20 district boards, where compulsory primary education is in force, we find that of 100 boys enrolled in the infant class, only some four reach class IV. In Allahabad District and Lucknow Municipality the enrolment of class IV is only one per cent. of the total. In Hardoi in the compulsory area out of 199 boys newly admitted in the infant class only three reached class IV after five years. Figures such as these must make us pause to consider whether we are to advance merely by expanding the present machinery of primary education or whether we are to find out another road.

13. The flight from schools and lapse into ignorance are due partly to the depressing school atmosphere, the inadequacy of furniture and books and inflexibility of curricula and courses, but mostly to poverty which compels the parents to withdraw pupils as soon they can take up, in however small a measure, the economic burden of the family. All the circumstances which stand in the way of a compulsory and long continued schooling favour a scheme of People's Schools with compulsory attendance for adults, between 18 and 45 and boys and girls in the afternoon or evening until they learn to read and write. Illiteracy does not disenfranchise anybody in India. As in Italy adult illiterates should not have the rights to vote or to secure employment in public services.

14. The work of abolition of illiteracy could be a subsidiary activity of the teachers of the present educational organization since

such instruction will take the form of afternoon or evening classes. Teaching hours, teachers' salaries and the participation of the primary school teachers in the work will have to be regulated in detail in the People's Schools as these are called in Turkey and China.

15. Several depressed castes as the *Pasi, Dhobi, Chamar, Bhangi* and *Dom* whose boys cannot sit on the same benches with boys of higher castes in the schools may easily be brought to schooling under the scheme of instruction in the People's Schools. Again, agricultural conditions and practices represent a sharp contrast as between Agra and Kumaun divisions, for instance. It will lead to great economy if the same set of teachers could be utilized for different types of instruction and even in different parts of the province. The Sonnino law in Italy made an effort to abolish illiteracy among the scattered population in the Southern Provinces and the islands through ambulatory schools and schools with two or three sessions a day. The ravine-stricken tracts and hill areas in the United Provinces could be dealt with by ambulatory schools in a similar manner.

16. Instead of appointing teachers for schools, certain areas or circuits may be placed in their charge. The teachers of People's Schools will proceed from village to village with a slogan such as "All able to read and write." Attendance will be compulsory both for boys and girls and adults as long as they cannot pass a simple test for reading and writing. In Turkey, where intensive efforts to wipe out illiteracy were begun in 1928, the principle of compulsory education was introduced for adults between 18 and 45 who were not attending schools or who could not pass an examination to show that they could read and write in the Latin characters. The classes of the popular or national schools were held late in the afternoon or in the evening. The same practice might be conveniently adopted here. In six years Turkey has solved the problem of the liquidation of illiteracy by these methods.

17. The time, place and period for adult instruction will be adjusted to local conditions and circumstances. During the months of April, May and June (first term) and again in October, November and December (second term), when agricultural tasks are over, teachers of the People's Schools will hold their classes in the day-time for teaching reading and writing and simple arithmetic for all villagers. In the hills their work will be concentrated in the months of December, January, February and March. This will involve the least interference with the ordinary routine of life of the peasant, without whose co-operation the task of universalizing literacy will be a chimera. Schools are closed even

now for several weeks during harvesting operations to meet the exigencies of rural economy. In the villages we can bring the children more easily together by means of moon-light schools (as in certain States in America) held in the *chaupal* or under the village *pipal* tree. A school building is not absolutely indispensable when we find as a matter of fact that a large proportion of our primary schools is housed free in the peasants' huts. During agricultural holidays and festivals, also in *melas* and markets, the itinerant teacher will be there teaching the three R's. In China they send teachers even to street corners where the rickshaw coolies, if they have a few minutes to spare, are taught reading and writing.

Assuming that a primary school becomes uneconomical with an enrolment of less than 50, we want 100,000 schools and 200,000 teachers to liquidate illiteracy merely of the 5,000,000 boys and girls in the province.

18. In a big mass drive against illiteracy of boys, girls and adults the adequacy or inadequacy of school building should not stand in the way. Gradually the Government should make a free gift of buildings for the People's Schools to house small libraries and museums of old manuscripts, images and art wares. (Too often the walls of our schools are bare or display pictures which are of foreign origin and on the lowest aesthetic level!) An instance of a rural library movement, full of possibilities for adult instruction, is afforded by the Maurawan Library in Lucknow. Half a dozen boxes carrying books circulate in an area of 10 square miles round about Maurawan, where the philanthropy of the *zamindar* has established a fine collection of old manuscripts, images and works of art. *Zamindars* and village *panchayats* could start an efficient library service in the villages through the periodical supply of selected books to village centres, usually the schools. A few well-chosen books may be circulated to an ever-widening circle of villages to stimulate progress-mindedness in the countryside.

19. A cart fitted with book-shelves is the indispensable adjunct of a popular library; it should go round not merely with books but also with pamphlets, magazines, newspapers, periodicals and reading material on current topics to places where libraries cannot be established. Such libraries or museums could become the nuclei of social education, improvement of social manners, popular recreations, games and festivals as in China. In the well-known mass education movement in Ting-Hsien in China teachers and workers travel from one village to another and are scattered in certain villages and at certain points of the district where propaganda is carried on intensively.

20. Thus a group of itinerant teachers, attached not to schools but to circuits or particular homogeneous areas, embracing, say, 10 to 15 villages will address themselves to the task of removing illiteracy. A school implies a curriculum, the itinerant teacher's duty is simply to wipe out illiteracy. He may manage very well even 50 pupils in the open air, meet them regularly for three months (one term) consecutively and teach them to read and write in two or three terms as may be found necessary. This may be called the preparatory period and if compulsion is to be introduced at all, it must be in reference to the number of terms required for each adult, boy and girl to attain a minimum standard of literacy. Such limited compulsion for all adults, boys and girls may be introduced all at once throughout the Province and this would avoid the delay of introducing compulsion in selected school areas where there is already an adequate number of schools and where public support is forthcoming.

21. Further, both in China and the Phillipines literacy is being achieved with extraordinary ease and quickness; in India we have to make experiments for adapting our vernaculars to the use of the methods now being employed in these countries with remarkable success. As in China, all pupils should learn the methods of teaching, reading and writing during their last school term and leave school with the intention of spreading these accomplishments. Laubach has followed the same plan systematically in the Phillipines with remarkable effects on the liquidation of illiteracy.

22. Efforts should also be made by a provision of stipends of, say, Rs.5 each, to get the wives of teachers trained and utilize them along with their husbands in the task of abolition of illiteracy among girls and women. In Turkey there is a considerable number of female teachers who are playing an important part in removing illiteracy in the countryside. Such women teachers could play an important part in the emancipation of the Indian village women. 'We want thousands of teachers to cope with the problem of mass removal of illiteracy. Our colleges are, on the other hand, turning out *en masse* more boys than can find employment. The majority of these could be sent out to the countryside with a social message. Central training schools would have to increase their number, accommodation, and equipment such as gramophones, cinemas and broadcasting courses especially designed for adult instruction.

23. The minimum essentials of History, Geography and Civics and the elements of Science may be taught with the help of the magic lantern and cinema and in this course the adults may

also join. This practical continuation course will prevent the lapse of literates into illiteracy which is now such a crying evil. The various lessons in agriculture and sanitation, which the Departments of Agriculture and Public Health are stressing, may be prepared in book form, and thus the children prepared for better farming and better methods of living. Perhaps it will be better to have several specialist teachers who will deal with "practical" subjects and will leave behind a box or small travelling library containing a few pamphlets and books of a practical and constructive nature. Gradually these will be adapted to local conditions, materials and problems.

24. In China during the initial stage of the mass education movement, of which rural reconstruction programme has been an outgrowth, the effort was concentrated on the removal of illiteracy, the simple texts being mastered by the average Chinese illiterate in four months' time. Beginning with 1929 the point of emphasis of the movement shifted from extensive promotion of literacy to the programme of rural recovery based on an intensive study of local life and conditions.*

25. The school as it is now conducted and the lessons that are taught engender a non-agricultural bias, which makes the parents rather dubious about the future of the children, who must remain villagers and adopt their own humble occupations. Both absenteeism and wastage are far greater among the agricultural than among the non-agricultural castes in this province for the cultivators do not at present find any use for literacy. The Superintendent for Census Operations points out that the enrolment at primary schools is largely fictitious and remarks: "The parents send their boy to school and leave him there so long as he is in the preparatory or even the lower classes, because this is a cheap way of keeping him occupied and out of mischief, because they are pressed to do so by the school master—or even by his superiors—who want to improve the look of their returns, or perhaps in case he shows a special aptitude for learning. They take him away as soon as the expense increases and he can make himself useful in the field or at pasture. This attitude is natural enough. He does not desire education for his children for its own sake, but only as a means of obtaining employment. There is thus no motive for educating the boy who is destined for the plough." This attitude of the peasant parents must be revolutionized in order that illiteracy may be removed. The co-operation of the parents will be very much easier to secure through the travelling teacher rather than through the school.

*The Ting Hsien experiment in 1934

The travelling teacher will have a practical outlook right from the outset in campaigning against illiteracy, and his lessons also can easily assimilate themselves to the needs of village uplift, agricultural or social, in which the parents are vitally interested.

26. Outside the zone of intensive developmental work, we have, however, to evolve a system of mass removal of illiteracy on a different method and plan. Here a cheaper and a more flexible system for removing illiteracy should be sought. It is impossible at present to find sufficient money and staff to enrol 50 lakhs of boys and girls and even if money is available, we cannot achieve literacy for more than 16 per cent. of the pupils on the roll, because of economic and social reasons and the defects of the existing system of primary education. Under the circumstances the aim of making every boy and girl literate will be achieved much sooner if we adopt in our areas of diffusive work or broadcast propaganda, shorter programmes of a two terms' course yearly for the purpose of teaching only the three R's rather than a full school curriculum extended over a number of years. Adult education should also be forthwith taken up if not for anything else at least for creating the proper atmosphere in the homes, which will nurture child literacy. The aim of adult instruction should be two-fold: the removal of illiteracy and the removal of the present hiatus between the lessons of the Agricultural, Public Health or Co-operative Departments on the one hand, and the peasant practices and modes of life on the other.

27. Of course the standard of literacy must be not one of mere ability to write one's name but to read intelligently the newspapers of the country and understand the printed pamphlets relating to agriculture, cattle, co-operation, hygiene, etc. which would supplement the lessons given by the itinerant teachers.

28. Evening, afternoon or holiday courses for boys and girls who do not attend schools and for adults who are unable to read and write should extend to one or two terms, i.e. 3 or 6 months, until literacy is acquired. These would gradually lead to vocational courses or the provision of libraries and cheap books or the promotion of adult recreative activities, festivals, sports, dramas or cinemas. Running through all these activities would be a programme of better farming, better living and improvement of sanitation and social intercourse, "education for life" in Grundtwig's phrase.

29. Through India's sense of legend and history, her love of drama and vocal music and her responsiveness to the spoken word, adult education could take another road different from the road by which peasant boys and girls are now made to travel. The present

system fails to make literate five-sixths of the boys and girls who come for primary instruction and makes a few literate at an excessive cost. Above all, the education it imparts does not touch intimately the ways of living and learning in the villages. The main object of mass education in India should be to help towards the modernisation of the village, towards rural reconstruction in the widest sense of the term. Chinese scholars and artists participating in the mass education movement at Ting-Hsien are striving to adopt the various cultural media to make them effective for their reconstruction programme. Literature, drama, painting, the great historical characters of Chinese history and the modern medium of the radio, are to be marshalled for the intellectual and spiritual nourishment of the people as well as for their recreation, to create a reconstruction mentality among the people and ultimately to rediscover the "soul of the race" and revitalize it for the modern world.

30. Village story-telling, dramas, folk songs and folk dances, festivals, *bhajan* parties and *kathas* as well as radio-talks, fairs, exhibitions and organized competitions and shows of all kinds could play a part in opening out new vistas of knowledge and experience for the peasants' minds in India.

31. The services of all must be enlisted, not merely teachers but also boy scouts and village guides; District and Municipal board members could also help. Travelling cinemas, magic lanterns, and gramophone records, supported by selected leaflets in boxes left behind should all be utilized in improving the villager's knowledge of improvements, and this according to the needs of the area. (We append Mr. R. H. Saloway's suggestive note which he submitted in this connexion.) Nothing will be imparted which is unreal or distant, which does not arise out of the habits, occupations and the daily intercourse of social living.

32. Indian villages were formerly self-contained communities and through the village temple, mosque and school, supported out of village funds, ignorance was removed to an extent hardly realized today. Through harnessing village communal endeavours and charities, through a homely simple humanism and experience of corporate life and effort, we have to prepare the younger generation of peasants for an intelligent adjustment to the more complex economic and social situation that now confronts them.

CHAPTER XIII

FINANCE

1. We consider it necessary to initiate a separate Rural Development Fund to which should be credited at the outset all the grants received periodically from the Government of India for developmental work such as grants for (i) rural development, (ii) road development, (iii) cane development, and (iv) hand-loom weaving. Any budget provisions for rural development from the Provincial Government should also be credited to this fund.

2. Besides, the United Provinces can justifiably lay claims on a portion of the income derived by the Central Government from excise duties on sugar and matches, about half of the former and a substantial portion of the latter being contributed by this province. Excise duties being primarily taxes on production, their proceeds should in all fairness be spent largely over the areas where these industries are concentrated. In the case of sugar the disturbance of rural economy and agriculture brought about by the rapid extension of cane cultivation and the problems of improvement of cane yield and transport particularly justify that a substantial part of the duty should be spent on rural development activities of the province. The diminution of forest resources of the province for which afforestation schemes may have to be undertaken give rise to a claim of this province for a share in the revenue from the match excise duty. We, therefore, urge that the Government should press these claims before the Government of India and place the proceeds, if available, in the Rural Development Fund.

3. We are also of opinion that a part of the proceeds of the new taxation recently imposed to meet the expenditure to combat unemployment should be utilized for rural development schemes. As a matter of fact the chronic under-employment of the agriculturists in normal years and prolonged unemployment in the recurrent drought years of the province affect much larger numbers and are fraught with far greater social consequences than the unemployment of the educated middle classes whose demands, however, are more clamant than those of the unvocal millions. Again, some of the developmental activities themselves, as for instance, the removal of illiteracy, the organization of co-operative societies, the programme of rural sanitation and the improvement of facilities of agricultural and industrial marketing will directly mitigate

unemployment and indirectly lay the foundations of a sounder economic order in which unemployment of the educated classes will be largely prevented.

4. Should the consolidated fund, as suggested above, prove inadequate we recommend that a small tax on tobacco may be levied. If the proceeds of this tax be earmarked for rural development it will not be objectionable and may bring in a fair amount of revenue for the Rural Development Fund.

5. Any scheme of rural development forced on the villagers from above will raise the expenses disproportionately high in relation to the cost. On the other hand, as our recommendations will show, the *panchayat* will be the pivot of rural reconstruction. It is, therefore, necessary that the *panchayat* should be authorized by statute to levy petty local cesses and imposts for village needs and institutions. We may profit a great deal from the practices and methods of village taxation which have survived the present centralization and are now being utilized for rural improvements in the Madras Presidency. Grazing and pasturage fees, fees for monopoly of grain weighment, bullock-cart taxes, fees for fishing monopoly, etc. may be levied as in Madras villages and spent for village improvement by the *panchayat*.

6. Sound developmental activities such as programmes of irrigation, improvement of roads and transport and the establishment of cottage industries will justify expenditure on the basis of loans even under orthodox finance. The present grants for various "protective" and "productive" works, as for instance, canal irrigation, hydro-electric development, afforestation and agriculture should also be utilized in the schemes of rural development and these departments must so try to arrange their future programmes as to fit in with the development plan so that the usual grants which are sanctioned may be available to some extent for development. Better co-ordination of the larger productive projects of the province with the smaller district, village and tahsil plans will in some measure obviate the necessity of fresh expenditure for the rural development programme.

7. Economy is also possible in the expenditure on touring and inspections of various departments as a result of better co-ordination and correlation.

8. Expenditure on broadcast demonstration, which will proceed side by side with the intensive programme, will not be high since the existing agencies will be employed. Additional money may be necessary for the payment of honoraria or rewards to the *kanungos* and *patwaris* or for distribution of improved bulls,

implements and manure at concession rates, for which grants will have to come from the departments concerned.

9. But expenditure on rural development will ultimately prove a more remunerative investment than anything else. In a few years its results should be apparent in the improved standard of living of the people and land revenue and income-tax should rise appreciably.

10. Developmental expenditure, through the reduction of want and ignorance and its effects on the transformation of the general trends of social life and living, will also make possible reductions in the expenditure on police and justice.

Supplementary report of the Committee of the Board of Economic Enquiry on Economic Planning, United Provinces, regarding the estimate of the cost of economic planning in the United Provinces.

At the third meeting of the Board of Economic Enquiry, United Provinces, held on the 24th August, 1936, the Board generally approved of the Report, and directed the Committee to give a supplementary report by the end of the year, giving an estimate of the cost of the scheme of economic planning having regard to the financial circumstances of the Government. Professors Rudra and Gurumukh N. Singh were appointed as additional members of the Committee.

The Committee met in Lucknow on the 7th and 8th November, 1936, and prepared an estimate of about Rs.20 lakhs as detailed below of the cost of the economic planning scheme. The Committee desire to stress that although an adequate scheme of economic planning, commensurate with the present economic situation of the province, should be more comprehensive and be undertaken on a more thorough-going scale, the present state of provincial finances would preclude it. The scheme embodies the indispensable minimum of effort for providing a co-ordinated drive in different spheres of life of the people. Naturally agricultural improvement, removal of illiteracy, medical care and cattle improvement have received greater stress. We recommend that the scheme be introduced in 9 Rural Reconstruction Centres, each embracing a circle of about 15 villages, in every district of the Province. It is desirable that three of these Rural Reconstruction Circles should be contiguous. This will provide the opportunity for developing local emulation and progress-mindedness in a compact area, contributing toward economic uplift and improvement of the general *morale* of the peasantry. The arrangement incidentally will permit certain important developmental activities to be undertaken more economically and effectively. A programme of consolidation of holdings seems to us important and urgent enough to make a beginning with the appointment of some supervisors, pending necessary legislative measures we have recommended.

Detailed estimates of expenditure are given below:

Items.	Monthly expenditure per circle Rs.
(1) One agricultural fieldman (he will also act as a resident organizer), pay Rs.30+Rs.10 travelling allowance ...	40
(a) Expenses on field demonstration	10
(2) Pay or allowances to adult male school teachers at Rs.12 per mensem per whole-time teacher for every 3 villages, and/or Rs.5 allowances where a teacher exists	70
(3) Pay of one woman teacher (in circles where there is no girls' school)	30
(4) Organizers for selected rural industries, pay Rs.35+Rs.10 travelling allowance	45
(5) Subsidy to resident physician (hakim or vaid holding certificate from recognized institution)	25
(a) Cost of medicines for the poor	15
(6) Lady Doctor and home visitor, pay Rs.75 (one for 3 circles) ...	25
(7) One resident mid-wife (for 3 circles) at Rs. 45	15
(8) Medicines and equipment for lady doctor and mid-wife (Rs.15 for 3 circles)	5
(9) Miscellaneous expenditure on education, sanitation, village lanes, etc.	50
(10) Veterinary Inspector (one for 3 circles), pay Rs.45+Rs.15 travelling allowance	20
(11) Stockman (for castrating, etc.) (one for 3 circles), pay Rs.15 per mensem	5
(12) Prizes for cattle breeding	5
(13) Veterinary medicines	10
(14) Opening of dispensaries in areas (3 circles) where there is no dispensary—	
(a) Doctor-in-charge at Rs.85; compounder at Rs.25; and peon at Rs.10	40
(b) Medicines and equipment for dispensary (Rs.60 per dispensary)	20
Total per circle per month	390
Total per circle per year	4,680
Total for 1 circle per district for the Province ...	2,24,640
Total for 9 circles per district for the Province ...	20,21,760
Pay of 4 supervisors for consolidation of holdings at Rs.40+Rs.15 travelling allowance=Rs.55 each ...	2,640
Grand Total ...	20,24,400

NOTE—Some saving may accrue under items 3, 4 and 14; hence the total expenditure required will be roughly about Rs.20 lakhs per annum.

R. B. GUPTA,
Secretary.

MOHD. OBAIDUR RAHMAN,
Chairman.

RADHA KAMAL MUKERJEE,
GURUMUKH N. SINGH,
HARI RAJ SWARUP,
S. K. RUDRA,
Members.

The 8th November, 1936.

CHAPTER XIV

Conclusion

1. We have stressed that in rural reconstruction work the main aim should be co-ordination, co-ordination not merely between the different developmental activities of the Government but also between outside help and local self-help. The latter could best be mobilized and led into a unified channel by the *panchayat*.

2. That the efficiency of one branch or section of Government departmental activity hangs on the efficiency of other branches or sections must now be clearly recognized. Without concerted regional initiatives not only will there be a waste of labour and material but there will also be demoralization due to failure.

3. The economic drive can only be successful if staff and materials be concentrated in a few localities creating several effective "salients" rather than employed on an extensive front over the entire province.

4. Such areas of concentrated attack will gradually increase from a circle of 12 to 15 villages, the nucleus of developmental activity for agriculture, co-operation and cottage production, into extending circles in which central institutions and agencies such as the agricultural farm and the central bank will come to operate.

5. The Education Department would also concentrate towards adult instruction for a circle of say 50 villages with a middle or a high school for the area; the health unit circle would embrace 50 villages after a preliminary 6 months' work in 10 to 15 villages and might have a dispensary and hospital; and the Veterinary Department dealing with cattle diseases and kindred problems would devote itself to even wider areas. The Central Store would collect the products of village and cottage industries for the entire area, supply raw materials, new designs, improved implements and technical and marketing guidance. And so on.

6. The Government should pass definite orders in order that there might be closer co-operation and correlation, that the different departments should not select different tracts for their work. Secondly, with the resident organizers in each circle of 12 to 15 villages the agency is fixed for securing co-ordination and co-operation. Elsewhere village *panchayats* and *patwaris* should be the links between the Government and the villagers.

7. What co-ordination can achieve can be illustrated by the experience in Partabgarh where rural reconstruction was started in 1927 and work was begun in 3 villages in which one was later on included for health propaganda initiated with the aid of funds from the Rockfeller Foundation. The work has since expanded enormously through co-operation and correlation of both official and non-official agencies. Of the latter the *panchayat* has proved a most valuable unifying force, furnishing an effective leadership.

8. In two hundred and eighty-eight villages the Co-operative and Agricultural Departments have co-ordinated their activities and pushed forward a rural welfare programme including Co-operative credit, better farming, tube-well construction and cattle improvement. Adult education, scouting, thrift and sanitary improvement have all contributed their quota for the uplift. There are 133 credit societies in this area besides 84 better farming and living, 75 education and 12 thrift societies. There are 4 seed stores. The Agricultural Department supplies improved seeds and implements and the Co-operative Societies distribute them among the cultivators. The area has now got 218 Meston ploughs, 134 three-roller cane mills and 12 Persian wheels. About 250 wells were sunk by members in a number of cases jointly and about 200 tube-wells bored. There are 25 superior breeding bulls in the area and the progeny is about 900. The Health Unit Circle has also extended its activities to 133 villages where all manure heaps have been removed outside the *abadi*. One interesting episode will indicate a peculiarly Indian method of dealing with conservatism and prejudice. An inspector of the Public Health Department went on hunger-strike for 3 days because the villagers could not be induced to remove the manure pits. He failed, however, to convince the villagers and the Health Department had to undertake the removal. One hundred and fifty indigenous *dais* have been taught sanitary methods. There are 34 village aided dispensaries run by members and an Ayurvedic dispensary is also maintained at one centre. Three thousand members including their children were vaccinated and two thousand persons were inoculated against cholera.

9. The District Boards have also helped towards rural awakening. There are 53 adult schools of which 2 are for females, 3 girls' schools and 20 reading clubs. Other developments in the right direction are the collection of rent of members through the co-operative society and development of fuel plantations. The *panchayats* have played their important traditional rôle in this movement. It is through them that village guides carry on all their important work and propaganda in the villages. They have also settled 700 disputes amicably outside the Courts.

10. Similarly in the work of rural reconstruction which has extended to about 150 villages in Benares, the *panchayat* has been reorganized and the heads of the residing families have become members of better-living societies. All activities which include agricultural improvement, co-operation, sanitation, control of litigation and social expenditure are under the direct supervision of the *panchayat*. Dharamghats are collected in the villages as of old and the proceeds are spent on charity. Sales of products of village handicrafts have been organized and these are conducted through *panchayats*.

11. In a district-wide campaign the rôle of the *panchayat* must be more strongly stressed. With the intensive programme in circles of 12 to 15 villages under the resident organizer, broadcast demonstration and propaganda should also be combined and here the links between the Government Departments and all kinds of Rural India would be the *panchayats* and the *patwaris*. The multiplication of too many organizations, inspections and inspectors would do more harm than good. We have to look more towards the organization of *panchayats* both for single villages as well as for groups of villages, which would be invaluable links between the old and the new, between conservatism and progress. The United Provinces Village *Panchayat* Act should be amended so as to provide for the establishment of a statutory *panchayat* in every village within a period of, say, 5 years and for the creation of Union *Panchayats* as those of Bengal. A single *panchayat* organization for all purposes through which the resident organizers, the patwaris and the field staff of the different departments of the Government would work will stabilize the movement of rural reconstruction. Without the aid of the *panchayat*, the effects of years of Government activities and propaganda would not lead to permanent improvement. With the *panchayat* vigilant and active, when after 3 or 5 years the resident organizer would move out to the area where a more diffusive kind of work had been going on, the villagers would not relapse into illiteracy, discord and disorganization.

12. In both intensive and diffusive work the *panchayat* would be both the means and the media of the new awakening of the masses. The unsatisfactory results of the early working of the village *panchayats* should not be made the ground for disbelief in the efficiency of this ancient institution. The renewal of ancient village solidarity and economic authority and management by means of the *panchayats* must be the aim of all economic planning. Thus the *panchayats* should be equipped with a larger share in the village administration and with substantial judicial and

criminal powers. Thus alone could we transfer the foundations of economic planning from Government initiative and guidance to the firmer basis of the commonsense of the peasant.

13. If the *panchayat* neglects its duties towards rural welfare and concentrates on its judicial and criminal functions the tendency could easily be checked. The recent proposal of the Central Provinces Local Self-Government Committee that if by the end of full one year a *panchayat* conferred with judicial and criminal powers has not undertaken administrative duties, its judicial and criminal powers should be withdrawn, is a step in the right direction. We suggest that the United Provinces Village *Panchayat* Act might suitably be amended to serve this object.

14. Economic planning superimposed from without would be a waste of money, personnel and energy. A multiplicity of advisers and inspectors would not only lead to confusion but also strengthen the present belief among the masses, baffling all initiative and progress, that nothing substantial could come in the village except from outside. In the revival of the corporate life of the village through its traditional organ, the *panchayat*, lies the only hope of economic planning.

CHAPTER XV

SUMMARY OF MAIN RECOMMENDATIONS

CHAPTER II

1. The programme of economic planning should be dual:

(*a*) Intensive planning in a number of circles of 15 villages each in every district; and

(*b*) Demonstration work of a broadcast kind in every village.

2. Proposed Organization:

(*a*) A Provincial Board of Economic Inquiry and Planning.

(*b*) District Development Boards.

(*c*) Village Panchayats and Co-operative Societies.

3. Suggested Staff:

(*a*) A Rural Development Commissioner and 3 Assistant Commissioners for inspection and supervision work.

(*d*) District Development Officers (one of the District Sub-Divisional Officers).

(*c*) An Inspector and village organizers in every district, and

(*d*) Patwaris and Kanungoes.

4. The intensive programme will be pushed by the village organizers who will be the link between the villagers and the staff of Government Departments.

The broadcast programme will spread over the whole country in extending circles from the centres of intensive development through the agency of *patwaris* and village *panchayats*.

5. The plan should lay down the development programme for five years in different fields.

6. Progress should be reviewed annually on the basis of analysis and comparison of statistics.

CHAPTER III

1. Different activities of the Agriculture Department should be co-ordinated and concentrated as far as possible in the development centres.

2. Legislation to deal with the pink boll worm and research work for the improvement of millets are suggested.

3. Fruit development in all its aspects should be encouraged by research, orchard experimentation and certain facilities to be given by Government to cultivators and horticulturists.

4. A seed-store should be organized in every village and the supply of improved seeds encouraged by commissions, bonuses, etc. offered to the cultivators.

5. Field demonstrations should be arranged on average farms within the village and expenses of improved cultivation rigorously controlled.

6. Private farms may be subsidized for demonstration work subject to departmental supervision.

7. The course of training for resident organizers should be given a more practical bias.

Chapter IV

1. In areas where the majority of the holdings are undersized the first task of agricultural planning should be consolidation.

2. If 33 per cent. of the *zamindars* and tenants apply for consolidation the village should be consolidated. Amendments of the Tenancy and Land Revenue Acts are suggested for this object.

3. Consolidation of cropping should be encouraged.

4. Judicious crop planning propaganda in the cane areas where deterioration of soil and dietary is apprehended is recommended.

5. The restriction of *ratooning* of cane and the fixation of definite quotas of sugarcane area in each province are desirable.

6. Crop and food planning are specially called for in the more heavily populated districts.

Chapter V

1. To check breed deterioration due to excessive numbers of uneconomic stock, legislation on the lines of the Bombay Act should be passed for the purpose of castrating all unfit and useless animals.

2. Ringing of bad cows is desirable.

3. Allowances should be given to *patwaris* and others through whom approved bulls are sold.

4. In forest divisions, tracts should be set aside for cattle breeding and improvement.

5. Introduction of lucerne and bersem as fodder should be pushed.

6. Fodder reserves should be built up systematically in ravine-stricken districts. Each village should be encouraged to have a hay stack.

7. Controlled grazing should be introduced under the supervision of the *panchayat* which may be authorized to regulate the number of live-stock and acquire and maintain pasture lands.

8. District Boards should pass bye-laws making the segregation of diseased cattle compulsory and prohibiting the trade in skins of such cattle.

9. Facilities of watering and bathing for village cattle should be provided by the Irrigation Department in canal and tube-well areas.

10. Co-operative societies and milk depots should be established in suitable centres and cold storage vans provided on fast trains for the promotion of the dairy industry.

Chapter VI

1. In such districts as Agra, Muttra and Etawah, a well boring staff should be maintained for well survey and location of sites.

2. Tube-wells, worked by electricity, cavity wells and deep masonry wells should be constructed in a development programme and managed by the State, and water sold by volume.

3. Suitable defensive vegetation should be propagated to prevent the invasion of barren sandy areas.

4. Government should grant special facilities and concessions for village afforestation by the *zamindars* and *panchayats*.

5. Building of *bundhs*, embankments and drainage works and closure to grazing should be pushed in the areas where ravines threaten cultivated areas by co-operation between the Agricultural Department, *zamindars* and *panchayats*.

Chapter VII

1. Government should take steps to conserve wells which form a flexible and supplementary source of irrigation and are especially valuable in drought years.

2. Economic surveys are necessary in the canal areas to find out where, to what extent and at what levels, wells could run along with canals or whether as alternatives or concurrently.

3. For the drier districts in the south, the programme of releasing more canal water from the Upper Doab by extension of tube-well construction should be pushed.

4. Government should limit the acreage under irrigation by each tube-well.

5. The volumetric sale of canal water should be introduced.

6. Government should explore possibilities of utilizing the Jamna in Muttra District and the water-falls in Bundelkhand for canal and reservoir construction as an experimental measure.

7. Well-surveys should be systematically undertaken in parts of Oudh where the sub-soil water level has declined and a boring staff should be maintained.

8. Demonstrations should be arranged for showing the cultivator the correct water demand and timings for irrigation for each crop.

9. Construction of *kiaries* in the fields and improvement of watercourses to prevent loss of water should be encouraged.

Chapter VIII

1. Facilities of technical guidance and research and grant of concessions such as cheap supply of raw materials under Government control, canal water, etc. should be offered for certain pioneer industries.

2. The manufacture of paper, sheet glass, paints and varnishes, shellac, cement and powers alcohol can be developed in various parts of the Province with the help of Government assistance.

3. An industrial survey of the province is recommended.

4. The Industrial Bank, the Provincial and Marketing Company and the Stock Exchange as proposed by the Industrial Finance Committee should be established early.

5. *Taqavi* loans may be given to small artisans under proper care and supervision.

6. Stores should be established in various centres for the supply of raw materials and for offering marketing facilities as branches of a central marketing organization.

7. The Principals of the Technical Schools should be entrusted with the tasks of supervision and improvement of the industries in their areas.

8. The School of Arts and Crafts, Lucknow, should appoint artist designers for textile, furniture, metal work and pottery designing and for introduction of improved patterns.

9. Technical advisers and Commercial travellers not merely for weaving but also for certain other arts and handicrafts should be appointed.

10. In the Ganges Grid area the hire-purchase system for the purchase of electrical equipment and a lower tariff rate for cottage industries should be adopted.

11. The Industries Department should maintain electrical *mistries* and subsidize smithies and repair shops in the grid area.

12. Finishing machinery and appliances and small power presses with moulds should be installed as an experimental measure in suitable cutlery centres.

13. Certain minor industries demanding scientific training of the workers should be especially encouraged by Government as avenues of employment for educated young men.

14. Octroi and terminal duties and tariff rates have to be revised in certain cases for the development of handicraft production.

Chapter IX

1. The Provincial Board of Communications should be reconstituted into a Board of Communications and Marketing.

2. Re-classification of the metalled roads and provincialization of arterial roads are desirable.

3. A larger share of the income derived from the motor vehicles tax should go to the District Boards, which might be required by statute to devote a certain minimum proportion of their income to roads.

4. Greater co-operation between the Irrigation Department and District Boards will be of advantage for road development.

5. A High Way Act for the Province is desirable.

6. A car-cart bifurcation could be usefully adopted for unmetalled roads.

7. The pneumatic equipment for bullock-carts should be encouraged.

8. *Panchayats* should be entrusted with duties towards the maintenance of village roads.

9. For encouraging motor transport grant of monopolies by public auction for limited periods is desirable.

10. Construction of light railways or tramways for the transport of cane, bricks and forest produce in suitable areas is recommended.

11. Standardization of weights and measures by legislation and licensing of village dealers is suggested.

12. Establishment of licensed warehouses and regulated markets by local Chambers of Commerce under Government supervision and inspection is recommended.

13. The desirability of a survey of markets, market practices, transport costs, methods of storage of grain, etc., is stressed.

Chapter X

1. Certain improvements and amendments of Municipal bye-laws are necessary to deal with congestion.

2. Suitable steps be taken to allow of the acquisition of land for the expansion of villages.

3. Travelling dispensaries should be multiplied.

4. Subsidized fixed dispensaries should be started as an experiment on Bengal lines.

5. Teachers in District Board Schools, resident organizers and village guides should be trained by the Health Staff for rendering first aid.

6. Indigenous *dais* should be given stipends for obtaining training in a women's hospital.

7. Improvement of village huts and lanes should be systematically taken up.

8. Compost making and the utilization of human excreta as manure should be encouraged by co-operation between the Agricultural and Health staff.

9. Maternity, child-welfare and family hygiene work should go together.

10. Wells built out of public funds should be thrown open to all regardless of caste and creed.

Chapter XI

1. Steps should be taken towards the early establishment of a Provincial Land Mortgage Bank.

2. Debt Conciliation Boards should be started as in the Central Provinces.

3. The Government should aid towards debt settlement and redemption of old debts by advancing loans to cultivators as in Madras and an amendment of the Agricultural Loans Act is necessary for this purpose.

4. Co-operative Societies should take up rural reconstruction work for engendering the right co-operative spirit.

5. There should be a closer linking of the activities of the marketing staff and the Co-operative Department.

6. A Provincial Co-operative Bank should be established early to function as the central financing and balancing institution.

7. The staff, teaching and courses at Partabgarh, Benares, etc., should be considerably improved so as to adapt the training of resident organizers and other rural workers to the new development programmes.

8. A Central Institute of Training for Rural Development should be established at Lucknow.

Chapter XII

1. Over-crowding of primary schools should be checked and the existing schools improved in accommodation and equipment.

2. Compulsory attendance, with or without compulsory enrolment, should be emphasized in primary schools.

3. Adult illiterates should not have the right to vote or obtain employment in public service.

4. People's Schools should be established in rural areas, where attendance should be compulsory for adults, boys and girls who cannot pass a simple test in reading and writing. These should meet late in the afternoon or in the evening.

5. Teaching hours, teachers' salaries and the participation of the primary school teachers in the work of People's Schools should be regulated in detail.

6. Teachers should be assigned circuits of 10 to 15 villages for adult instruction.

7. Easier and quicker methods of removing illiteracy should be experimented with.

8. Women teachers should be encouraged.

9. Adult instruction should stress a rural reconstruction programme.

10. Older cultural media and the modern films and radio talks should be equally utilized to create a reconstruction mentality.

Chapter XIII

1. A separate Rural Development Fund should be initiated. Periodical grants from the Government of India such as those for rural development, handloom weaving, road development and cane development and separate provincial budget provisions for rural development should be credited to this Fund.

2. The Government should press their claims for a fair portion of the central revenues derived from excise duties on sugar and matches. Grants thus made available should be credited to this Fund.

3. The Village *Panchayat* should be authorized to levy petty cesses and imposts for village needs and institutions.

4. A small tax on tobacco is suggested for rural reconstruction, if the funds from other sources are not adequate.

Chapter XIV

1. Statutory *panchayats* should be established in all villages within a period of, say, five years.

2. Union *panchayats* should be formed like those in Bengal.

3. The United Provinces Village *Panchayats* Act should be amended and the *panchayats* given judicial and criminal powers, which might be withdrawn if the administrative powers with reference to agriculture, sanitation and rural welfare in general are neglected.

MOHAMMAD OBAID-UR-RAHMAN
(Chairman).

RADHA KAMAL MUKERJEE,
HARI RAJ SWARUP,
MUNSHI LAL GUPTA,
(Members).

R. B. GUPTA,
(Secretary).

15-4-'36.

APPENDIX I

United Provinces Government's Schemes for the Economic Development and Improvement of Rural Areas

1. *Introduction*—During the 1935 budget session of the Central Legislature the Government of India placed before that legislature a demand for grants to the provinces and minor administrations for expenditure on approved schemes for the " economic development and improvement of rural areas," i.e. for the " betterment of their economic position " interpreted in its broadest sense so as to cover not only measures designed to improve the actual money incomes of villagers but also their health and education and to make them self-reliant.

2. *Total cost*—Leaving aside the share (about Rs.65,000) which this province expects to get out of the allotment (Rs.15 lakhs) earmarked by the Central Government for the furtherance of co-operative activities, the share of the United Provinces out of the funds specifically allocated for rural development in general is Rs.15 lakhs. The local legislature has already sanctioned Rs.1,00,000 under Grant no. 34—Agriculture (Account head 34—KK—Rural Reconstruction) and it is proposed to place before the next budget session of the Council another demand for an equal amount. The total available for expenditure on rural development in two years will thus be Rs.15+1+1=17 lakhs.

3. *Spread over two years*—The Government of India's grant is not a recurring one, but the expenditure out of it can, and is proposed to, be spread over a longer period than one year; as a matter of fact the schemes for this province have been spread over two years. All the United Provinces schemes have been approved by the Government of India and the necessary sanctions for expenditure have already been issued.

4. *Main Scheme*—The Main Scheme which, in certain respects, is a special feature of the United Provinces Schemes, is expected to cost about Rs.9 lakhs, i.e., about Rs.4½ lakhs per year and is intended to stimulate and promote the spirit of self-help in the villages and rouse it into action. For the present 72 villages have been selected in each of the 45 plains districts; the selection has been so made as to focus, as far as possible, the benefits resulting from Government's normal activities in various departments, e.g., Irrigation (tube-wells), Agriculture (cane development), Public Health, Industries, Co-operative, on the villages under the Main Scheme.

To this end the Local Government have engaged, for about two years, a special temporary staff for each such district consisting of (i) six organizers, and (ii) one inspector to guide and supervise the work of the organizers. The organizers are to work more or less on the lines followed by the " village guides " of the co-operative movement.

Conditions in the Kumaun Division differ materially from those obtaining in the other divisions of the province, and neither the Main Scheme nor the departmental schemes could be applied to that division;

hence special schemes suited to local conditions and requirements have had to be worked out.

The staff has been put through special training in sanitation and hygiene, agricultural practice and co-operative methods and is to work under the control of the district officers.

District rural development associations, with consultative functions, have been set up in the districts.

For the execution of minor local works of public utility a sum of at least Rs.5,000 (on the average) has been placed at the disposal of each of the 45 district officers. The cost of the staff and the district allotments together with a small reserve for unforeseen opportunities is estimated at Rs.9 lakhs for the two years. Out of this the Local Government propose to provide Rs.2 lakhs; this will be utilized towards the expenditure on the staff. The balance, viz. Rs.7 lakhs, will be debited to the Central Government's grant.

The organizers were selected by the district officers of the respective districts and sent up, in two batches, for training at three centres, namely, Benares, Gorakhpur and Bulandshahr. The inspectors were selected by Government on the recommendations of a departmental committee. Almost the whole of the staff has now been appointed and trained; generally speaking, it is already at work. The sanctioned emoluments are Rs.80 *plus* fixed travelling allowance Rs.20=Rs.100 for the inspectors and Rs.25 *plus* fixed travelling allowance Rs.10=Rs.35 per mensem for the organizers. The Rural Development Officer will be the formal controlling authority for accounts purposes; district officers are, however, to have unfettered control on the allotments for the staff and for minor local works of public utility in their respective districts.

Besides this paid staff two honorary organizers have also been appointed, viz., Rai Bahadur Pandit Gur Sewak Upadhya for Benares and Azamgarh Districts and Khan Bahadur Bashir-ud-din Ahmad Khan for Allahabad division. Suitable amounts have been provided for their travelling allowances.

For the supervision and co-ordination of these activities in the districts Government have selected Mr. C. S. Venkatachar, I.C.S., as Rural Development Officer and have attached him to their headquarters. Through his tours he keeps Government in touch with developments in the districts, and advises district authorities on the lines to be followed. He has also prepared a Manual of Rural Development, copies of which have been placed on the table of the House; this Manual explains the lines which in this Government's opinion should be followed in tackling the problems of rural development.

5. *Departmental Schemes*—Apart from the provision for the Main Scheme funds aggregating 8 lakhs have been allocated to certain departments for what may be called departmental schemes of development and improvement.

A—Agricultural Improvements

A sum of Rs.3·28 lakhs has been allotted for agricultural schemes. The approved schemes on which this allotment will be spent relate to

(i) subsidies (of up to one-third of the total cost) for borings within existing wells, (ii) guarantees against complete or partial failure of such well-borings, (iii) subsidies (of up to one-third of the total cost) for the construction of earth embankments to prevent or reduce erosion and/or to enable moisture to be retained or controlled, (iv) cost of a tractor (including its maintenance for two years) for constructing embankments and for the eradication of *kans*, (v) the development of fruit in about 800 out of 3,240 villages selected for the Main Scheme through the supply of grafts, plants, seed, etc. and the employment of trained fruit *chaudhris*, (vi) buying up of deteriorated village seed and supply of fresh seed to take its place, (vii) subsidies to 75 seed stores under private management, (viii) grant-in-aid for poultry farming and goat improvement.

B—Public Health and Medical Relief

For public health and medical relief the sanctioned allotment for the two years, is Rs.3·16 lakhs. It is proposed to set up nine health units, one in each division except Kumaun. These units are adaptations of the health unit which has been at work in a certain area of the Partabgarh District, the main deviations from the Partabgarh type being the utilization of the existing departmental staff, ruralized programme of work and simplification in keeping with the rural environment. Each unit would cover an exclusively rural, and as far as possible, compact area of about 50 villages with a population of about 30,000 at an estimated average cost of about Rs.11,000 per annum and would aim at the development of the sense of personal hygiene and "social" sanitation among the villagers themselves. Each public health unit will undertake the simpler forms of medical relief in the villages; this medical complement of the scheme is estimated to cost Rs.2,540 per unit per year. Public health work and medical relief have been dovetailed into each other, and the selection of centres for the health units has been so made as to utilize the services of the district health staff, wherever available. A scheme estimated to cost Rs.36,000 per annum for the supply of about 3,000 village medicine chests so as to furnish medical aid against minor ailments to those villages which have been selected for the Main Scheme has also been inaugurated; any surplus left over after serving these villages will be utilized for the benefit of villages outside that scheme.

C—Industrial and Co-operative work

Marketing is now held to offer an obvious and promising direction for State aid to village and cottage industries. The following marketing schemes, which are a speciality of the United Provinces, have therefore been approved:

(i) Rupees 8,000 will be allotted to the Emporium of Arts and Crafts, Lucknow (a Government institution under the Industries Department) to cover the cost of initial outlay on account of intelligence and publicity work for the benefit of village and cottage industries and as insurance against the risk of possible loss from the marketing of the products of such industries by the Emporium.

(ii) Subsidies to experimental retail shops under private management; for the larger centres the average subsidy will be at the rate of Rs.50 per month and for the smaller ones Rs.35. Discretion has been left to the head of the department to vary the amounts according to local conditions and requirements. The "Bee-hive" at Naini Tal, an interesting and promising experiment in marketing, will receive a subsidy from this allotment.

(iii) Co-operative marketing of *ghee* in the *ghee*-producing districts of Etawah, Agra, Muttra, Aligarh, and Etah and subsidies to two private *ghee* associations for the maintenance of control and testing laboratories and staff for certifying the purity, etc. of the *ghee* analysed by the associations. This scheme follows the "tried and tested" line of work in the Co-operative Department in the *ghee*-producing trans-Jumna tracts of Agra and Etawah Districts and is intended to stimulate work pioneered by the Ghee Producers' Association at Etawah.

(iv) The establishment of five co-operative stores for the marketing of the products of village industries, e.g. leather, leather goods, metal-ware, certain textiles not included within the scope of the Textile Scheme, and industrial products like *moonjh* mattings, ropery, *tat-pattis*, baskets, sandals, stone-ware, wooden and other toys, etc. These stores will follow the model of the Textile Store to be set up with the Government of India's textile grants.

6. *Working in Kumaun Division*—For Kumaun Division a sum of Rs.50,000 has been allotted. Naini Tal Districts has been given Rs.25,000, viz., Rs.10,000 for the supply of piped drinking water in the neighbourhood of Haldwani, Rs.10,000 for *diggis* (drinking water tanks) in villages in the *bhabar* tracts and Rs.3,000 for anti-malarial measures in the *tarai* and *bhabar* tracts. (Rs.2,000 has been kept in reserve.) The allotment to Almora District is Rs. 12,500 and will be utilized on development of communal forests through the Panchayat Forest Officer, improvement of water supply in the four sub-divisions of the district and fruit development. The sanctioned schemes for Garhwal District include the improvements of cattle-breeding, the development of vegetable gardens at various centres—mainly along the pilgrim route the erection of a model village, development of communal forests and the development of fruit. Agricultural improvements through seed supply, popularization of improved technique, etc. will also receive some attention.

7. *Publicity and propaganda*—A sum of Rs.36,000 has been allowed for instruction, publicity and propaganda work in the villages in order to ensure abiding results from Government's rural uplift work. The 3,240 villages which are being brought under the Main Scheme will receive, *gratis* newspapers, monthlies and reprints featuring rural uplift articles and news at least once a week; the estimated cost is Rs.30,000 for the two years. A hundred sets of double-sided records pertaining to rural uplift will also be prepared at a cost of Rs.6,000.

8. *Summary*—For the sake of convenience a tabular summary is given below.

30th October, 1935. S. P. SHAH

TABULAR SUMMARY

(1) *Main Scheme* .. .. Rupees 9 lakhs, of which one lakh has been and another one lakh is expected to be provided from provincial revenues.

	Cost for two years Rs.
(*a*) 45 Inspectors at Rs.80 per mensem each *plus* Rs.20 per mensem fixed travelling allowance (45×100×24 months) ..	=1,08,000
(*b*) 6 Organizers in each one of 45 districts at Rs.25 per mensem each *plus* Rs.10 per mensem each fixed travelling allowance (45×6×Rs.35×24 months)	=2,26,800
(*c*) Cost of training of (*a*) and (*b*)	15,000
(*d*) Grant of at least Rs.5,000 (average) to each District Officer in 45 districts	4,50,000
	8,00,800
(*e*) Reserve (approximately)	1,00,000
Total say ..	9,00,000

The whole of the sanctioned grants from the United Provinces Provincial revenues will be utilized towards the cost of the staff.

	Rs.
(2) *Departmental Schemes*	8,00,000

A—AGRICULTURE

(i) Subsidies for well-boring and guarantees against complete or partial failure	1,38,000
(ii) Embankments and reservoirs	79,000
(iii) Fruit development in about 800 villages	20,000
(iv) Supply of fresh seed to replace deteriorated seed	50,000
(v) Subsides to 75 private seed stores	30,000
(vi) Grants for improved poultry farming and improvement of goats	11,000
	3,28,000

B—PUBLIC HEALTH

(i) Nine modified health units at Rs.11,000 each	1,98,000
(ii) Nine medical complements attached to the health units at Rs.2,540 each..	45,720
(iii) Supply of about 3,000 village medicine chests	72,000
	3,15,720
or say ..	3,16,000

C—Industries (including Co-operative) Schemes

	Rs.
(1) Marketing of the products of village industries :	
(*a*) Grant to the United Provinces Arts and Crafts Emporium, Lucknow, for intelligence, publicity and propaganda and for guarantee against loss	8,000
(*b*) Subsidies to private retail shops for marketing products of village industries	24,000
(*c*) Co-operative stores for marketing products of village industries other than certain textile lines	28,000
(*d*) Co-operative marketing of *ghee* and subsidies to two *ghee* associations for the establishment of control and testing laboratories	10,000
	70,000

D—Publicity and Propaganda

(i) Supply of newspapers and periodicals featuring rural uplift articles and news, to villages in which the Main Scheme is operating	30,000
(ii) Preparation of gramophone records pertaining to rural uplift ..	6,000
	36,000
(3) *Kumaun Division Schemes*	50,000

	Naini Tal Rs.	*Garhwal* Rs.	*Almora* Rs.
(i) Public health including improvement of water supply	23,000	..	6,000
(ii) Fruit development	..	2,000	..
(iii) Conservation of civil forests	..	3,300	5,200
(iv) Improvement of cattle	..	2,500	..
(v) Agricultural improvements including vegetable growing	..	3,400	..
(vi) Miscellaneous	..	800	..
(vii) Reserve	2,000	500	1,300
	25,000	12,500	12,500

APPENDIX II

Note on Village Reconstruction in Partabgarh (Oudh)

The main features of the Partabgarh method are a comprehensive programme of village uplift including better farming, education, sanitation, thrift, amicable arbitration, and social reforms, concentration and co-ordination of the efforts of different departments in a small area, unification of the training agency in one person to prevent confusion in the villager's mind arising from the visits of a multiplicity of different officials; and intensive and continuous propaganda through a resident and where possible local guide. The approach is co-operative.

A beginning was made in 1927 with three societies in different parts of the district which were intended to be centres of expansion. With the help of the District Board, adult schools were started under village school teachers, and improved seeds and improved methods of agriculture were introduced with the collaboration of the Agricultural Department. The guiding agency at first was the ordinary co-operative supervisor. The work soon expanded, the number of centres rose to six, and in 1929 six village guides of the cadre of supervisors were placed in separate charge of the centres. A rural improvement committee was set up with the Deputy Commissioner as patron and the Deputy Director of Agriculture as chairman and an inspector of co-operative societies as secretary. The committee includes representatives of the Court of Wards, the District Board, the District Board Education Committee, the Veterinary Department and the Department of Agriculture, Agricultural, Engineering, and Public Health.

The number of centres is now nine, embracing 171 villages. With the expansion of work, a new class of worker known as the assistant village guide has been recruited. He is a local man who is trained for four or five months and then put in charge of two or three societies. His duty is to get the panchayats to carry out the various items of the programme and in addition he runs an adult school. There are 39 such assistant guides. Their work is supervised by village guides who have a circle of about 20 societies; in some societies which have no assistant guides, the guides themselves are in direct charge. Three of the centres with 50 societies are under the charge of supervisors of credit societies—here the work is on a more restricted scale. Recently ten new assistant guides have been appointed on Rs.3 per mensem for propaganda alone—they do not run adult schools. Some adult schools are run by local men who are paid a small honorarium of Rs.30 per year. Also there is a lady supervisor for organizing better living and thrift societies among women.

Village guides are controlled by the Deputy Director of Agriculture, the immediate supervision being in the hands of inspectors of the Co-operative Department and of agricultural superintendents and inspectors.

A programme of work is drawn up, discussed at meetings and entrusted to *panches* for execution. The assistant village guide is there

on the spot to assist and train them. Group conferences of societies are held periodically at which difficulties and results are compared and discussed and future lines of action decided. Throughout, the aim is to make the members improvement-minded and to teach them to combine and to take the initiative themselves. When some progress has been achieved and some experience of local conditions and problems obtained, one-year and three-year programmes as laid down which the societies are expected to accomplish. A good idea of the line of work will be obtained from a sample three-year programme which is attached to this note.

The scheme costs about Rs.8,000 a year. Village guides absorb about Rs.2,500 paid by the United Provinces Co-operative Union, of which Rs.2,000 are contributed by Government. Assistant village guides, training expenses, honoraria to school teachers, and incidental expenses account for the rest—the Agricultural Department contributes about 2,000, about Rs.1,000 come from contributions from the societies, and the rest comes out of the budget of the Co-operative Department.

The success of the scheme is to be judged in the results. Unfortunately, the period of development of these activities coincided with a spell of bad harvests and low agricultural prices and the tangible results as measured in increased wealth are obscured by these factors. Also distress tended to demoralization, and peasants struggling for means to pay their rent and vainly waiting for good rain were apt to be rather impervious to the teaching of the virtues of parapetted wells and soakage pits. Allowance must be made for these circumstances in judging the results. The following is a summary of what has been done.

1. *Agriculture*—The purchase and distribution of improved seed was organized. There was no cultivation of improved cane; now four-fifths of the total area under cane is of the improved varieties. Two-fifths of the wheat area is under Pusa wheat. Meston ploughs, three-roller cane mills, Persian wheels were unknown; now the number is 218, 134 and 12 respectively. More Persian wheels cannot be introduced owing to the low level of sub-soil water in most of the villages. About 250 wells were sunk by members (in a number of cases jointly) and about 200 wells bored. Two tanks and four *bunds* have been jointly repaired. New seeds, e.g., improved barley, Kabuli gram, maize, early arhar, groundnuts and improved potato have been introduced. Intensive cultivation is hampered by the absence of irrigation facilities. Manure pits have been improved and their number is now about 5,000. There are 1,600 urine preservation beds. Green manuring has been practised in some societies. There are 25 superior breeding bulls and their progeny is about 900—the new breed is admittedly bigger and better. A cane-crushing and sugar-making experiment was attempted at Niwari and an engine was installed but the cost was prohibitive and the mill has been closed.

Four co-operative seed stores are run by the societies themselves, and about 2,600 maunds of improved seed was distributed by them last year. One store has a godown of its own and another godown is being constructed.

2. *Sanitation*—In 133 villages all manure heaps have been removed outside the *abadi*. One hundred and fifty indigenous *dais* have been taught sanitary methods. Clean *dhotis* and *dais*, boxes have been provided by some societies. There are 34 village-aid dispensaries run by members and an *ayurvedic* dispensary is also maintained at one centre. Twelve thousand patients were treated last year. Two hundred wells have been parapetted. Three thousand members and their children were vaccinated or inoculated. Soakage pits have been constructed and there is a perceptible improvement in cleanliness.

3. *Adult education and scouting*—There are 51 adult schools, 2 female adult schools, 3 girls' schools and 20 reading clubs with an enrolment of about 1,500. About 600 of them have obtained proficiency of the preparatory standard in the 3 R's and 200 of the primary standard. General knowledge—account keeping, first aid, knowledge of elementary rent law and land records, information about railways, post offices and the like—is also attempted to be given, but the success attained has been small—the causes have been both the poor educational calibre of the guide-teacher and the apathy of the taught. The schools attempt organization of community life through physical culture clubs, games, group singing, dramas and scouting. The number of scouts is 350 and they have done useful work in improving village sanitation and in rendering service during fairs. A dozen small libraries have been started and are used by reading clubs; after three years the adult school is converted into a reading club.

4. *Curtailment of ceremonial expenditure and thrift*—About 84 societies attempted curtailment of ceremonial expenditure. Limits are laid down and those transgressing them are liable to fine. Two persons were fined. Fines are usually impolitic and persuasion must remain the main remedy. Economy is reported to have been practised in 430 ceremonies and resulted in a saving of about Rs.11,000. In all about Rs.30,000 are estimated to have been saved in the last few years. These figures are not reliable and most of the reported economies are probably due to economic depression but there certainly has been some awakening in this respect. One reason for slow progress is that the heterogeneous village *panchayat* has not sufficient sanction behind it to enforce curtailment of ceremonial expenditure or to remove the bigger social evils in the face of the *biradari*. Six hundred and seventy-one members practised thrift and saved Rs.7,042.

5. *Other improvements*—Seven hundred disputes were amicably settled through *panchayats*. Fuel plantation has been made in 50 *bighas*. Vegetable cultivation for home consumption has been introduced in over half the villages. Some societies made joint purchase of cloth and in some means of communication have been improved through joint effort.

A reflection of better farming and better living is to be found in the improvement brought about in the working of the credit societies. The average membership of the Partabgarh societies is 28 while the provincial average is only 21. The percentage of collections to demand is 52, whereas the provincial figure is 24. Again, the percentage of overdues to the total outstandings is only 40 as against 68 the provincial average.

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The number of credit societies in the district has increased from 147 in 1926 to 220 in 1934. Besides this 10 thrift societies among men and 11 societies among women for thrift, better-living and education have also been established.

These are tangible results but results equally valuable though less visible are to be seen in a quickening of the desire for improvement and in the growing self-reliance of the societies. In the older societies less and less work has to be done by the guides, and given time and perseverance, success can be looked forward to.

VISHNU SAHAY,
Registrar, Co-operative Societies,
United Provinces.

Three-year programme of work

Agricultural

1.	Improved manure pits—(*a*) one pit ..	All families.
	(*b*) two pits ..	75 per cent. of the members.
2.	Urine preservation beds	75 ditto.
3.	Green manuring	50 ditto.
4.	Improved seeds—(*a*) wheat	90 ditto.
	(*b*) sugarcane	90 ditto.
5.	Ploughing with Meston plough	75 ditto.
6.	Wells—(*a*) Boring in wells needing it ..	All.
	(*b*) Cleaning of do.	All.
7.	Rouging wheat fields	75 per cent. of the members.
8.	Vegetable cultivation	75 ditto.
9.	Improved breeding bull	One to be arranged.
10.	Demonstration of better farming	One member at least to undertake it on one bigha.
11.	Hot weather cultivation	10 members.
12.	Introduction of 3 roller cane mills or such other machinery as improved furnaces for *Rab* or *gur*.	According to needs.
13.	Improvement of irrigation facilities, e.g., new wells, repairs of tanks, Persian wheels, etc.	Preparation of a scheme and its partial compliance.
14.	Consolidation of holdings	Preparation of a scheme.

Sanitation

1.	Removal of pits outside *abadi*	All.
2.	Soakage-pits, where necessary	All.
3.	Platforms on wells used for drinking water ..	50 per cent. cases.
4.	Knowledge of precautionary measures against contagious diseases.	90 per cent. members.
5.	Knowledge of first aid	90 ditto.
6.	Vaccination	All.
7.	Ventilation	25 per cent. of old houses and in all new houses.
8.	Training of *dais*	All.
9.	Filling of pits inside *abadi*	A part.
10.	Provision of medicine chest	One chest.
11.	Cleanliness, houses, personal	90 per cent. of members.

	Education	
1.	Sending of all boys of school-going age to schools.	80 per cent. of members.
2.	Sending of all girls of school-going age to schools	50 ditto.
3.	Education of adults	To see if an adult school is necessary and to start one if possible.
4.	Education of adult females particularly cleanliness, thrift, etc.	40 per cent.
	Economic	
1.	Thrift by *chutki* system	75 per cent. of members.
2.	Thrift in cash or grain	75 ditto.
3.	Curtailment of ceremonial expenses	75 ditto.
4.	Fuel plantation	Some work.
5.	Development of cottage industries	ditto.
	General	
1.	Improvement of communications	Some work.
2.	Formation of better farming and better living societies.	To include 90 per cent. of families.
3.	Recreation club (singing, physical culture, library, etc.).	To establish it.
4.	Development of unity, self-help and co-operative spirit.	To an appreciable extent.
5.	Reform of social evils and undesirable customs..	Ditto.

APPENDIX III

Note on the Health Unit Scheme at Partabgarh.

The Health Unit Scheme was inaugurated in the district of Partabgarh 2¼ years ago with the aid of funds given by the Rockefeller Foundation. The total expenditure on the Health Unit comes to Rs.30,000 annually. In the first year the Foundation met one-half of the cost of the scheme, the other half was met by the Public Health Department in the form of the pay of staff deputed to the Unit and the Provincial Red Cross fund. In the second year the grant from the Rockefeller Foundation was decreased to one-third, two-thirds being met from Red Cross and Public Health Department. In the third year the grant has been reduced to roughly one-fourth of the total and the balance is being met by Public Health Department and Red Cross.

The scheme was initiated at the instance of the Rockefeller Foundation with a view to give the same protection from preventable diseases to the villagers as are enjoyed by the residents of urban areas and to create a sanitary conscience amongst the masses and to afford facilities in regard to maternity and child welfare work in all the villages under the jurisdiction of the Health Unit Scheme.

The scheme is at present operative in one municipality, two town areas and 53 villages having 40,000 population covering roughly an area of 40 square miles. The following staff is working in the area:

1 Medical Officer—An officer of the Provincial Public Health Service with qualification of M.B., B.S., D.P.H., who has received special training in this method of work in the U. S. A.

4 sanitary inspectors.

1 labour gang of 6 coolies.

1 lady doctor.

3 health visitors.

8 midwives.

11. Indigenous *dais* and clerical establishment.

The office is accommodated in the Town Hall at Bela which has been kindly placed at the disposal of the health unit by the Municipal Board, Bela.

The whole area is divided into four circles and each circle is manned by the following staff:

One sanitary inspector, two midwives and one health visitor.

The sanitary inspector looks after the general sanitation, vaccination, registration of vital statistics and sanitary improvements of permanent nature and trains teachers and scholars in anti-epidemic work and gives demonstrations by magic lantern on health subjects and epidemic diseases. They are in direct charge of the surface cleanliness of the area in which they work and get manure heaps removed to fields and

have the villages swept by the labour gang as well as by the villagers from time to time. They carry out anti-epidemic measures under the direction of the Medical Officer and during the non-epidemic season the staff is engaged in getting manure pits dug, trench pattern and bored-hole latrines made, wells improved and made sanitary to prevent outside contamination. Attempts are being made also to provide soakage pits for the disposal of waste water and sullage of lanes and private houses. Demonstration cattle sheds have also been made in a few villages. Lighting and ventilation have been improved in quite a large number of houses by providing windows and ventilators.

Maternity—Midwives attend normal labour cases and conduct deliveries at the villagers' homes. All abnormal cases are advised to go to the Dufferin Hospital. Anti-natal and post-natal clinics are held by the health visitors twice a week and expectant mothers are given instructions on rearing of infants, health subjects, domestic hygiene, personal cleanliness and the precautions to be taken during the course of pregnancy and confinements. They have succeeded in popularizing the maternity work to the extent that 75 per cent. of confinements are conducted by qualified midwives. Lady doctor supervises the work of health visitors and midwives and holds clinics and inspects scholars in the lower primary schools. The clinics are held at the houses of midwives. Majority of the indigenous *dais* have been trained by the midwives and health visitors and almost 30 per cent. of them have been supplied with maternity boxes. Twenty-six First Aid dispensaries have been opened in the whole area to give medical relief. These are housed in schools in the houses of village guides.

Junior Red Cross groups have been formed in 20 schools and the boys have been trained in anti-epidemic work.

Vaccination—Barring those who are unfit for vaccination every child born during the year is vaccinated by sanitary inspectors, midwives and health visitors.

The Health Unit area also serves as a field training centre for the public health personnel of the province.

APPENDIX IV-A

Note on Cane Development and Marketing Scheme by J. H. Ritchie, Esq., M.A., B.Sc., I.A.S., Director of Agriculture, United Provinces, Lucknow

The Government of India have sanctioned a scheme for the improvement and marketing of sugarcane in the areas round about sugar factories in the province and the State tube-wells in the Hydro-Electric Grid area in the district of Meerut and Moradabad. The estimated annual cost for sugar factory areas is about 2·25 lakhs and in the State tube-well areas about ·68 lakhs.

A copy of the scheme for sugar factory areas is enclosed. The development of State tube-well areas is being carried out on similar lines except that there are no sugar factories to pay a part of the scheme to Government. The cultivation of sugarcane is being developed and arrangements made for the sale of the crop to the local *khandsaris*.

The schemes started late in the year 1935-36, i.e., from November, 1935, and are continuing during 1936-37. The actual provision in the budgets for the two years is as follows :

	1935-36	1936-37
	Rs.	Rs.
1. Scheme for the improvement and marketing of sugarcane in factories	1,89,500	2,29,698
2. Scheme for the improvement of sugarcane in the tube-well areas	45,500	69,886

The receipts on account of factory contribution amount to Rs.63,000.

In the factory areas 21 zones of development and marketing are in operation. These are grouped in two ranges—Eastern and Western with headquarters at Gorakhpur and Bareilly respectively, each in charge of a Cane Control Officer of the United Provinces Agricultural Service or United Provinces Co-operative Service. Each of them is assisted by a Deputy of nearly the same rank together with the requisite ministerial and menial establishment.

The Western Range is under the administrative control of the Director of Agriculture, United Provinces, and the Eastern Range under that of the Registrar, Co-operative Societies.

The State Tube-well Development area is in charge of an officer of the United Provinces Agricultural Service (headquarters Meerut) with a non gazetted assistant and office staff.

Details of work done in the last year are shown in the notes enclosed.

CANE DEVELOPMENT AND MARKETING SCHEME IN FACTORY AREAS

I—Programme of Agricultural Development

The Scheme aims at the following developments:

1. The introduction of high yielding and effective sucrose containing canes of early, mid-season and late ripening varieties so as to provide the needs of the factories at the various periods of the working season. This will be secured by the establishment of seed farms or seed farmers whose cane will be reserved entirely for seed purposes. Such seed farms will put down selected varieties and be paid 9 pies per maund extra over the rate obtaining in the factory at sowing time, for every maund of cane seed supplied. The seed will be issued to the growers at 3 pies below local rates. There will be a seed centre at each village society or for every 200 acres of cane.

2. Improvement in the present standard of manuring:

(*a*) by green manure and compost extension, and

(*b*) by supplies on credit against the next crop of departmental fertilizer mixtures.

3. Improvement in yield by right spacing and more effective inter-cultural methods.

4. Securing irrigation facilities as far as possible.

5. Organization of Co-operative measures to reduce insect pests and the consequent damage to crops.

II—Supply of cane to the factories

6. The Development Organization will act as contractor for the supply of the cane of this area to the factory which will pay to the Development Organization a commission of three pies per maund of sugarcane supplied to it. The Development Organization will not deal with the cane of non-members who do not adopt better farming practices.

7. Where advances to growers are necessary, the factory will be requested by the Development Organization to make the same. The advances plus interest would be deducted by the factories, when making payment for the cane to the Development Organization.

B—ALTERNATIVE SCHEME

8. Under the alternative scheme the factories—

(*a*) contribute Rs.6,000 in place of Rs.3,000 which the factories under the full scheme contribute, so as to meet certain expenditure which under the full scheme is to be met from the commission of 3 pies per maund of cane supplied which the factories under the alternative scheme will not pay;

(*b*) arrange purchase of cane direct from growers or better farming societies but the Development Organization would provide

the data as to whence the factory could get canes of suitable ripeness within the limits controlled by them;

(*c*) make the necessary advances for seed, manure or fertilizers in cash or kind, making their own arrangement for recovery from the price of cane supplied when paid; and

(*d*) permit, if required, a representative of the Development Organization or the Better Cane Growing Societies to be present at the weigh bridge in the interest of the cane growers within the development area.

C—GENERAL

9. The following staff and funds will be provided for development of the area:

(Per cane development area of approximately 2,000 acres)

Staff	Year				
	1st	2nd	3rd	4th	5th
	Rs.	Rs.	Rs.	Rs.	Rs.
One Assistant Cane Control Officer on Rs.80—5—150; peon on Rs.10 and travelling allowance Rs.20 per mensem.	1,320	1,380	1,440	1,500	1,560
Three fieldmen supervisors on Rs.30—½—35—1—40; porter on Rs.7 and travelling allowance at Rs.8 per mensem each.	1,620	1,656	1,692	1,728	1,764
Nine kamdars on Rs.15 per mensem each.	1,620	1,620	1,620	1,620	1,620
Subsidies					
1. Seed suppliers per maund of seed supplied (over local rate for cane, 9 pies).	4,000	4,000	4,000	4,000	4,000
2. Cane growers per maund of seed purchased (below local rate) 3 pies, i.e., 64,000 maunds at 1 anna.					
Miscellaneous..	300	300	300	300	300
Total ..	8,860	8,956	9,052	9,148	9,244

Average cost—Rs.9,000 approximately.

Contribution—Rs.6,000 by Government and Rs.3,000 by factories.

10. The funds of the Development Organization made up of the commission at 3 pies per maund of cane supplied under the full scheme and the part of contribution of Rs.3,000 under the alternative scheme will be utilized on the following objects:

(*a*) Special staff to be engaged during the marketing season—Rs.1,800 to Rs.2,000.

(*b*) Improvement of transport and other facilities Rs.2,000 to Rs.4,000.

(*c*) The creation of an increasing reserve to finance cake and fertilizer purchased for advances to cultivators.

Note on the work done under the Scheme for Improvement and Marketing of Sugarcane in the factory areas.

The following factories joined the scheme :

Name of the mill	Location	The scheme under which they joined	District
Western range			
1. Hindustan Sugar Mills ..	Golagokaran-nath.	II	Kheri.
2. Lakshmi Sugar and Oil Mills ..	Hardoi ..	I	Hardoi.
3. The Jai Lakshmi Sugar Co., Ltd...	Doiwala ..	I	Dehra Dun.
4. Modi Sugar Mills, Ltd. ..	Begamabad..	I	Meerut.
5. Simbhauli Sugar Factory ..	Simbhauli ..	I	Do.
6. The Upper Ganges Sugar Mills, Seohara.	Sheohara ..	I	Bijnor.
7. Kesar Sugar Works, Ltd. ..	Baheri ..	I	Bareilly.
8. Rosa Sugar Factory	Rosa ..	I	Shahjahanpur.
9. The Oudh Sugar Mills, Ltd. ..	Hargaon ..	I	Sitapur.
10. Lakshmi Sugar Mills Co. ..	Maholi ..	I	Do.
11. The Ganga Sugar Corporation ..	Deoband ..	I	Saharanpur.
Eastern range			
1. The Diamond Sugar Mills, Ltd. ..	Pipraich ..	I	Gorakhpur.
2. Shri Sita Ram Sugar Co., Ltd. ..	Baitalpur ..	I	Ditto.
3. The Punjab Sugar Mills Co., Ltd...	Ghugli ..	I	Ditto.
4. Ishwari Mills, Ltd.	Lakshmiganj	I	Ditto.
5. Ramkola Sugar Mills, Ltd. ..	Ramkola ..	I	Ditto.
6. Maheshwari Khetan Sugar Mills, Ltd.	Do. ..	I	Ditto.
7. Basti Sugar Mills, Ltd. ..	Basti ..	I	Basti.
2. Madho Kanhaiya Mahesh Gauri Sugar Mills.	Munderwan..	I	Do.
9. Nawabganj Sugar Mills Co., Ltd...	Nawabganj..	I	Gonda.
10. U. P. Co-operative Sugar Factory, Ltd.	Biswan ..	II	Sitapur.

Regular work in 9 out of the 11 zones in the Western Range was started in November, 1935, while the Hargaon and Deoband zones were added towards the end of January, 1936. The area of these zones is generally limited to a radius of 5 to 6 miles. Each zone has been divided into three supervisors' circle and nine kamdars' beats. 200 to 300 acres, divided almost equally in each supervisor's circle, have been secured in each zone for growing cane for seed next year. In the Hargaon zone the area secured up to this time is only 80 acres, as this zone was started late; the mill people are satisfied with this beginning. In the Western Range 783 cultivators were enlisted and 1,407 acres were sown with improved varieties of cane in 7 zones. The information about the remaining 4 zones is not yet available.

In the Western Range sugarcane seed and manure worth Rs.37,668 was issued in 8 zones on *taqavi* and cash as follows :

Cane seed			Manure		
On taqavi	Cash	Total	On taqavi	Cash	Total
Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
21,769	3,717	25,486	10,939	1,243	12,182

A sum of Rs.1,000 per zone was spent in bringing seed from outside and not added to its cost. Three sugar mills in this range also made advances to growers for purchase of seed amounting to Rs.7,371. The quantity of improved seed supplied is 90,834 maunds as detailed below :

	Co 312	Co 313	Co 350	Co 331	Others	Total
Maunds	47,837	12,114	1,232	17,437	12,214	90,834

The supply was principally limited to Co's 312, 313, 331, and 350, the departmentally recommended varieties, except in Doiwala, Dehra Dun, where EK 28 and 290 were distributed.

Four akola hoes and a McCormic cultivator are being supplied to each zone to aid and demonstrate the inter-cultural processes. Germination is reported satisfactory and arrangements for green manuring for the next crop are being made.

In the Eastern Range 93,104 maunds of cane seed of improved varieties was issued to the growers as detailed below :

	213	285	300	312	313	331	350	356	393	Total
Maunds	72,865	1,922	50	11,515	2,705	3,181	8	358	500	93,104

The bulk of the seed was supplied from the Government farms and some from reliable private farms certified by the Deputy Director.

17,080 maunds of artificial manure consisting of castor cake and ammonium sulphate was also supplied in this range mostly on *taqavi*. In addition to this, *neem* cake was also given out whenever necessary. The effect of artificial fertilizers has been very beneficial to the germination of cane. The mills have been requested to give out free supplies of potash and phosphate manures to the growers in order to build up better sucrose and purity of juice. In the Eastern Range a sum of Rs.26,264 was advanced as *taqavi* for the purchase of seed and manure.

A survey of zonal villages in the Eastern Range is being made with a view to improve the irrigation sources. Ordinary measures have been suggested to eradicate the pests of white ants and borers and diseased specimens have been sent to the Entomologist to Government, United Provinces, Cawnpore, for detailed study and for recommending proper steps for eradications.

Note on the work done under the Scheme for the Improvement of Sugarcane in the tube-well areas

The Scheme aims at educating the small holder in simple practices of better farming, resulting in substantial financial advantages in the

form of increased outturn and in the reduction of cultivation expenses and in the eradication of crop diseases. The working is similar to that of factory zones.

The Scheme has been taken up in three tube-well zones of 68 wells in the Meerut District and two zones of 37 wells in the Moradabad District. The number of villages under command is 205, and the total area 5,047 acres. The actual work was started in November, 1935.

Remodelling of holdings with the aim of recasting the individual fields so as to facilitate operations and at the same time to link up other small holdings to form even blocks, neatly demarcated, properly levelled and easily manageable was started on the fields of 3,334 cultivators.

135,041 maunds of sugarcane seed was distributed on *taqavi*, amounting to Rs.61,058-14. The varieties distributed are—

Co 331, Co 213, Co 312, Co 244, Co 313, Co 290 and Co 317

The quantity of manure supplied on *taqavi* in the five zones was 12,310 maunds costing Rs.37,752.

In the controlled area *Line Sowing* of cane and mechanical inter-culture is getting popular. The officer-in-charge of the Scheme is working in co-operation with the Irrigation, Revenue, and the Rural Development Officers.

APPENDIX IV-B

Note on Cane Development and Marketing Scheme by Vishun Sahay, Esq., I.C.S., Registrar, Co-operative Societies, United Provinces, Lucknow

The Scheme was sanctioned late and work began only in November last. I can give you details of the work so far done in the Eastern Range which is under my control. Ten factories viz., Biswan, Nawabganj. Basti, Munderwa, Pipraich, Baitalpur, Ghugli, Lakshmigunj, Ramkola No. I and Ramkola No. 11 have joined the Scheme under alternative I, i.e. they have agreed to contribute Rs.3,000 Government contributing Rs.6,000 under the full scheme of cane development and marketing. Villages where the work would be taken up have been selected and propaganda for the formation of better farming and marketing societies has been taken in hand. In addition, training classes for the staff have been held both in the field and in theory. The area round each factory covers 2,000 to 2,500 acres of sugarcane. Each area is under the control of the officer called Assistant Cane Control Officer equivalent to the rank of an Inspector of Co-operative Societies. In the ordinary development area there are three fieldmen and nine kamdars under the Assistant Cane Control Officer. Intensive propaganda for improved seed so as to form the supply for next year has been made and 90,000 maunds of seed are being put down this year. The seed is of various qualities—213, 312, 313, etc., so that the seasonal requirements of the factories may be met. The business is being financed out of *taqavi* or loans taken from co-operative banks. Manure at the rate of four wagons per area is being sold to members at nearly half price. The manure is one part ammonia and eight parts of castor cake.

APPENDIX V-A

The Ganges Canal Hydro-Electric Grid Scheme

1. *Historical*—The Upper Ganges Canal, which commands 4½ million acres between Hardwar and Aligarh, passes over 13 falls of which eight are economically suitable for electrification. Of these, four falls, at Bahadurabad, Bhola, Palra and Sumera respectively, were originally developed for power purposes for three local schemes carried out in 1929-30. The Bahadurabad falls were to supply energy for electrifying the principal towns in the Saharanpur, Bijnor and Moradabad Districts as well as for pumping 200 cusecs from the Ramganga river for irrigation on the high ground between Seohara and Moradabad. The Bhola falls were to energise Meerut, Ghaziabad and Hapur. The Palra and Sumera falls were to supply power to Khurja and also for pumping 100 cusecs from the Kali Nadi into the Ganges Canal. After work had been begun it was decided to link these three systems into a connected net-work or "grid" spread over the seven western districts from Saharanpur-Shahdara in the west to Chandausi and Kasganj in the east and Agra in the South. The inter-connection of the local net-works enabled four main objectives to be attained, (*a*) all the 88 towns in the seven* western districts, having a population of 5,000 and over could be electrified for domestic and industrial purposes, (*b*) the intervening tracts with their small towns, villages and widespread rural loads could be supplied with power for industrial and agricultural purposes (*c*) power could be made available over a wide area for pumping water for irrigation from rivers and tube-wells, both State and privately owned and (*d*) the connected power systems could help each other at times either of maximum load or of individual failure.

2. *The* 1931 *Project*—The total cost of the 1931 project which was completed in 1934, comprising four power stations yielding 9,000 kilowatts, including 1,000 kilowatts of oil engine stand-by plant, together with 860 miles of transmission lines and 167 transformer stations was Rs.1,38,56,070 as sanctioned by the Secretary of State. The gross estimated revenue was Rs.16·56 lakhs after allowing for subsequent adjustments in regard to the domestic guaranteed revenue.

3. *Interim Projects*—During the years 1931 to 1933 demands for cheap grid power developed in adjoining towns resulting in a steady expansion of capital outlay on various extensions. Instances of these are the Meerut Cantonment extension in 1931-32 at a cost of 1·81 lakhs, the Agra to Tundla line in 1932-33 costing 1·74 lakhs and the Kasganj installation in 1933-34 at a cost of 2·06 lakhs. These and other minor extensions were financially justified by their direct return on the additional capital involved. But it was in the rural areas that the chief demand for expansion arose as a result of the cheap power made available for private tube-wells and other agricultural activities. Up to date

* NOTE.—Since extended to ten.

no less than 208 new branch lines to zamindars' farms have been constructed with a total mileage of 280 at a cost of 5·75 lakhs for transmitting 3,068 horse power to the various zamindari plants.

4. *The Tube-well Project*—Further, as a result of the department's experimental tube-well installations laid down in 1931 to 1933 which showed that a wide extension of irrigation by means of State owned tube-wells was possible, it was decided in 1934 to develop the vast irrigation project which has recently been sanctioned by the Legislative Council. This enterprise provides for the construction of some 1,500 wells to command nearly two million acres in the western districts within the next two years, of which total, 812 will be in operation for the next sugarcane season.

5. *The 1934 Enquiry Committee*—While the tube-well scheme was being prepared, the Government decided to submit the hydro-electric project with its then existing commitments as well as all pending demands for future power to a competent committee in order to secure an examination of its commercial and technical aspects from all points of view. The first Ganges Grid Enquiry Committee was accordingly appointed in January, 1934, including experienced electrical engineers from Madras and Bombay, a financial expert from the Punjab and two influential members of the local Legislative Council.

6. The 1934 project as placed before the Committee provided for the gradual completion of the scheme in "stages" to be advanced as the electrical demand should develop. The "stage" principle enabled the capital to be developed parallel with the load thus avoiding the incurrence of unremunerative outlay. Stage I which is now complete provided 9,900 kilowatts at a total cost of 194 lakhs offering a gross annual return of Rs.19·75 lakhs or Rs.1·25 lakhs net after deducting interest, working expenses and depreciation.

An ultimate expenditure of Rs.4,32,82,359 by 1948-49 and a net return of Rs.37,32,697 or 8·6 per cent. was forecasted.

7. The Committee's report of February, 1934, which was confined to the first and second stages was widely circulated to members of the Council and the press. The conclusions arrived at in the report may be briefly summarized as follows :

(1) That the scheme is fundamentally sound from an economic and technical point of view and the estimates of construction costs are reasonable on the basis of present day rates and prices.

(2) The construction of Salawa generating station is recommended within the next five years provided that the load estimates are realized.

(3) After further examination, economies in the operating establishment may prove possible in the near future.

(4) The power tariffs as a whole are reasonable, compared with those in force elsewhere in India, and sufficiently attractive to compete effectively with other forms of power and to reduce the cost of production to the industrialist. Any reduction of these

tariffs is not advisable until the load has developed to the generating capacity of stage 1.

(5) With favourable economic conditions, the load and revenue forecast for the next five years should be realized. An important factor in the development of load will be the progress of the State tube-well irrigation scheme which is sound and should be encouraged.

8. The subsequent decisions of 1935 to accelerate the completion of the tube-well project necessitated a fresh examination of the grid financial forecast as outlined in Appendix A of the Committee's report. A revised estimate for developing the remaining power stations on the Ganges Canal together with a combined steam stand-by and peak load station at Chandausi at a cost of Rs.337 lakhs was therefore prepared. The cost of the transmission lines and transformer stations to feed the rural net-works for energising the remaining State tube-wells has also been included. Careful investigation has shown that the construction of a "peak-load" steam power station at Chandausi for energising the 700 tube-wells in the Moradabad and Budaun areas is likely to be cheaper than the alternative policy of constructing two or possibly three additional power stations on the canal some 150 miles distant, and transmitting the power to the Chandausi area by means of duplicate high capacity lines. In other words, the incidence of cost of thermal power generation at Chandausi is less per unit than that of the interest, depreciation and maintenance charges on the higher capital cost involved in bringing hydro power from a much greater distance.

9. *The* 1935 *Enquiry Committee*—As the above Committee had examined only the first two stages of the 1934 proposals, the Public Accounts Committee suggested a further examination of the 1935 project when it was brought to their notice. The Government accordingly appointed a second Enquiry Committee in November, 1935, to examine and report on the Chief Engineer's 1935, estimate of the capital cost of the ultimate scheme as then proposed. Also to examine the forecast of load development and revenue together with the proposals for engineer establishment. The Committee was to re-examine the general scope and extensions of the scheme and to report on its adequacy to supply the electrical and irrigation requirements of the area affected in the light of data available from the project already in operation. The recommendations of this Committee which comprised electrical experts from Madras and Mysore, a financial expert from the Government of India, a representative each of the Legislative Council and the Upper India Chamber of Commerce may be summarized as follows:

(1) The revised scheme is technically and economically sound and the construction of the works should be proceeded with in accordance with the programme outlined in the Chief Engineer's report.

(2) The proposed generating capacity and transmission lines are adequate for the demand forecasted.

(3) As a measure of safety a contingent provision of 10 per cent. should be added to the works estimates of the Mohammadpur power

station, the installation of the third turbogenerating set at Chandausi and the works estimate of the transmission lines to be constructed in 1937 and thereafter.

(4) The working expenses are adequately estimated.

(5) The load and revenue estimates should be realized.

(6) A careful study of industrial load development should be undertaken by the department.

(7) A revision of departmental and licensees' tariffs should be carefully considered.

(8) All industrial consumers requiring a high tension supply of energy should be supplied direct by the department.

(9) The areas of licensees should be confined as far as practicable within municipal limits and urban areas.

The last four proposals are now under examination.

10. The total estimate after revision as suggested by the Committee amount to Rs.342·88 lakhs including all previous commitments and overhead charges. It covers the cost of seven canal power stations including the original four as well as those at Salawa and Chitaura which are now under construction. The remaining station provided for will be built at the Nirgajni falls in Muzaffarnagar District instead of at Mohammadpur as originally proposed. Including the steam auxiliary station at Chandausi, an aggregate installed generating capacity of 27,900 kilowatts will thus be provided of which 20,633 kilowatts will be available for utilization after making allowance for machinery under repairs and losses on the transmission system.

The outlay also provides for new high tension feeders from Nirgajni to Chitaura, from Sumera to Chandausi, from Chandausi to Budaun and from Belari to Moradabad in addition to some 1,000 miles of 11,000 volt branch lines necessary to connect the remaining tube-wells now under construction to the grid net-work. Provision has also been made at a cost of 3·3 lakhs for constructing a further 230 miles of branch lines to zamindars' farms.

11. *The revised estimate*—As a result of the development of State tube-well irrigation at a more rapid rate than was anticipated, it has been found necessary to accelerate the construction programme with a view to completing the whole scheme within the financial year 1937-38. It is accordingly proposed to borrow Rs.64·19 lakhs in 1936-37, which have already been included in the Capital budget, and Rs.61·31 lakhs in the year 1937-38.

12. *The allocation of power*—Of the power available, it is estimated that 2,900 kilowatts will be required for domestic purposes in the 88 towns served by the grid, 10,500 kilowatts for minor urban industries, 3,400 kilowatts for agricultural purposes including zamindari tube-wells, 10,970 kilowatts for the 1,500 State tube-wells now under construction, and 2,650 kilowatts for river and canal pumping schemes.

In allocating the power available for these various loads, the "diversity" which has been found to obtain in the case of certain loads

which operate only for part of the day, has been taken into account. For instance, whilst canal and established State tube-well pumping installations which operate all day in the irrigation season have obviously no "diversity", experience has shown that a diveristy factor of 3·1 can safely be assumed for domestic, minor industrial, agricultural and railway loads. In other words, 1,000 kilowatts of power at the generating stations can provide for loads of these types aggregating 3,100 kilowatts on the distribution system. This phenomenon, known as "diversity", is due to the fact that individual motors and lights are not as a rule worked simultaneously.

Minor industries—In regard to the industrial power facilities afforded by the grid, an aggregate of 9,399 horse power in 965 small motors is already connected to the grid, of this total 3,592 horse power is utilized for 401 flour mills, 228 horse power for 67 brass and metal lathes and 5,579 horse power for oil crushing plants, rice hulling mills, etc. The number of such small motors is steadily increasing and the recent introduction of cheap seasonal and two-part industrial tariffs is likely to stimulate minor electrified industries.

13. *Power for irrigation*—The scope offered by the scheme for increasing the irrigation facilities of the province is of sufficient importance to warrant a brief description. Three hundred and ninety cusecs are already being pumped from the Ramganga and Kali rivers for canal irrigation and 250 cusecs are to be supplied from tube-wells into the Ganges Canal system in Meerut and Bulandshahr Districts in order to release river water for much needed canal extensions in the arid districts of Muttra and Agra where the construction of tube-wells as a means of local irrigation is not feasible for geological reasons. Eighty cusecs are already being thus pumped and an important project which was recently sanctioned by the Legislative Council for remodelling the Mat Branch to enable it to carry the increased discharge to Muttra is now under construction. Should these so-called "conversion" schemes now under trial prove remunerative they can be extended to the limit of the power still available on the Ganges Canal. The 1,500 State tube-wells now being installed in the Meerut, Bulandshahr, Bijnor, Moradabad and Budaun areas will, as stated above, absorb 10,970 kilowatts from the grid. These tube-wells will yield 2,250 cusecs in the aggregate for protecting some two million acres of land at present uncommanded by canals in which area 186,000 acres of sugarcane, 375,000 acres of wheat and 90,000 acres of other *kharif* crops will be irrigated annually within three years' time.

In addition some 180 zamindari wells which are being energised by the grid will yield a further 270 cusecs.

Thus, the grid scheme furnishes the means of supplying a total of 3,160 cusecs for additional irrigation in the western districts or more than half the cold weather flow of the Ganges river.

Apart from this, power has also been made available at a rate of one anna per unit for agricultural purposes, and 9 pies per unit for irrigation pumping, at no less than 1,970 transformer points throughout the rural area covered by the grid. The importance of these amenities for cheapening the cost of production is obvious.

14. *Depreciation*—Turning now to the working expenses it should be explained that in the project estimate sanctioned by the Secretary of State in 1931, depreciation was computed by what is known as the "sinking fund" method under which a smaller annual debit is made on the ground that the instalments funded at compound interest rates will contribute the full value of the plant within the period of its life. This practice is, however, open to certain objections. Due to the recent fall in interest rates, the method of computation has lately been revised and the simple interest or "straight line" method of computation, has been substituted in the revised project under which the annual contribution towards depreciation equals the value of the plant divided, by its life in years.

The result of this enhanced depreciation contribution is of course to reduce the apparent net profit on the scheme in the initial stages but to secure a larger and more continuous reserve for the replacement of obsolete machinery, thereby securing a higher factor of financial safety. For instance, in the Grid Committee's report on the 1934 scheme with a capital of 192 lakhs in 1935-36, the depreciation allowed by the Committee was 2·3 lakhs as against 4·1 lakhs now being put aside for the current year.

As regards the life adopted for the various types of plant on the grid, the Grid Enquiry Committee of 1934 recorded as follows:

> "The lives assumed for various items of plant and equipment are reasonable. In the case of transmission lines the poles of which are made of Tata rails, the provision is very liberal. Our conclusion is that the provision for depreciation as a whole is satisfactory with reference to the prices of plant and equipment now obtaining. Its adequacy should, however, be examined at least every three years in the light of the estimated cost of replacement of the plant at rates then in force."

15. *Establishment*—Under "establishment" the annual charges against revenue as stated in column 11 of the Schedule have been based on that share of the cost of the actual staff to be engaged, which is debitable to revenue—the remainder of the cost being debited to capital. The allocation of hydel establishment charges between capital and revenue in any year is thus proportionate to the amount of capital, and revenue plus maintenance charges respectively handled by the staff during that year. Thus, in years of high capital outlay the cost of establishment debitable to revenue is lower than in later years when the annual capital charge decreases.

16. *Repairs*—Provision has been made in column 12 of the Schedule for annual and special repairs on the basis of actual experience gained over a period of years. Replacements and major renewals of plant will be financed from the depreciation fund.

17. *Operating Ratio*—In paragraph 41, Chapter III of the Grid Enquiry Committee's Report, 1934, it was remarked that the "operating ratio" (or proportion of total working expenses to gross revenue) exceeded 50 per cent. in 1934-35, and the advisability of reducing this ratio as soon as possible was pointed out. A reference to the Schedule will show

that the operating ratio for 1935-36 is 48·5 falling to 42·3 in 1939-40. In considering these figures it must be remembered that in a project such as the Ganges Grid with eight separate generating stations and 1,970 sub-stations spread over a wide area, the establishment costs must always be higher than those of more concentrated schemes.

18. *Cost per unit*—It is anticipated that 312 lakhs of units will be sold in the current year rising to 771 lakhs when the grid is fully developed in 1943-44. The average cost per unit inclusive of all charges is expected to be 11·8 pies in the current year, 10·4 in 1936-37 falling to 8·51 in the completed scheme.

19. *Financial aspect*—Turning now to the financial aspect of the enterprise, a glance at the attached schedule will show that with a capital outlay of Rs.168·33 lakhs incurred up to the end of 1934-35, the gross revenue for the current year is estimated at Rs.18·98 lakhs as compared with the estimated yield of 16·56 lakhs of the 1931 project after making adjustments on account of subsequent charges in the licensees' guaranteed revenue. The following figures show the recent progress in electrification in both urban and rural areas. During the year 1933-34, 21,276,882 units were generated on the grid out of which 16,470,968 units were utilized. In 1934-35 these figures rose to 30,023,856 and 24,025,034 respectively. In 1934-35, 1,178,076 units were consumed for agricultural purposes rising to 1,340,913 units in the period April to December, 1935. For irrigation pumping from State tube-wells 1,596,978 units were consumed in 1934-35 against 4,499,890 in the nine months April to December, 1935 inclusive. The gross anticipated ultimate revenue as shown in column 10 of the schedule attached will be seen to rise from 19·14 lakhs in the current year to Rs.45·04 lakhs in 1943-44. Of this it is estimated that 4·49 lakhs will be derived from irrigation pumping in 1935-36 rising to 19·18 lakhs from this source in 1941-42. Hence rather more than 40 per cent. of the total revenue will eventually accrue from State-owned pumps for which there is a secured load. The working expenses are expected to rise from 9·31 lakhs in the current year to 20·67 lakhs in 1940-41, *vide* column 15 of the schedule. After deducting interest charges, depreciation and working expenses, it is estimated that there will be a net surplus of 2·34 lakhs in 1936-37 rising steadily to 8·43 lakhs in 1940-41. It must be remembered that the grid revenue from tube-wells will be subject to the rainfall variations of different years. As in the case of any irrigation scheme these seasonal variations average out over a series of years and the revenue forecast may be accepted with confidence.

20. It will thus be seen that whilst enabling some two million acres of land at present unprotected by irrigation, to be commanded and nearly three-quarters of a million additional acres to be irrigated every year, the project may be expected at an early date to contribute a modest sum to the reduction of the provincial revenue deficit. Further it will enable minor industries to be developed in the towns and villages to an increasing degree, thus enhancing the prosperity of the countryside.

The enterprise has, however, a wider importance in that it opens the way for an electrical advance on a larger scale into tracts hitherto beyond the reach of the Ganges Canal falls as a source of power. The combination of steam generation with a hydro-electric system will enable the benefits of cheap electricity to be extended eastwards to millions of agriculturists existing at present in arid tracts with little hope of economic relief.

ROORKEE:
February 3, 1936.

W. L. STAMPE,
Chief Engineer (Development),
Irrigation Branch.

GANGES CANAL HYDRO-ELECTRIC GRID

ULTIMATE DEVELOPMENT

SCHEDULE I—*Abstract of financial results*

Revised January, 1936

Lakhs of Rs.

Year	Capital outlay to the end of the previous year			Capital outlay during the current year	Accumulated arrears of simple interest to end of the previous year	Total of columns 4 and 6	Revenue			Working expenses					Net revenue = column 10—column 15	Simple interest for the year	Net gain or loss = column 16—column 17	Percentage of net revenue or deficit = column 16—column 17
	Direct charges	Indirect charges	Total				Gross revenue for the year	Simple interest on Depreciation Fund	Total of columns 8 and 9	Establishment and operating staff including leave and pension charges	Maintenance and repairs charges	Depreciation charges	Indirect charges	Total				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1934-35 ..	152·03	0·56	152·59	15·74	12·94* 16·58	169·17	15·34	..	15·34	4·17	1.94	4·09†	0·01	10·21	5·13	8·77	—3·64	3·0
1935-36 ..	167·63	0·70	168·33	49·82	16·81	185·14	18·98‡	0·16	19·14	3·12	2·08	4·10	0·01	9·31	9·83	10·08	—0·25	5·3
1936-37 ..	217·00	1·15	218·15	63·42	14·47	232·62	23·83	0·33	24·16	2·42	2·93	4·11	0·01	9·47	14·69	12·35	2·34	6·3
1937-38 ..	279·85	1·72	281·57	61·31	11·34	292·88	29·04	0·49	29·53	3·43	4·00§	4·12	0·01	11·56	17·97	14·84	3·13	6·1
1938-39 ..	340·62	2·26	342·88	..	7·65	350·53	34·62	0·66	35·28	6·57	4·45	4·53	0·02	15·52	19·76	16·07	3·69	5·6
1939-40 ..	340·62	2·26	342·88	..	1·20	344·08	38·76	0·84	39·60	6·78	4·45	5·83	0·02	17·08	22·52	16·07	6·45	6·5
1940-41 ..	340·62	2·26	342·88	..	..	342·88	42·64	1·07	43·71	6·78	4·45	7·96	0·02	19·21	24·50	16·07	8·43	7·1
1941-42 ..	340·62	2·26	342·88	..	..	342·88	42·90	1·39	44·29	6·78	4·45	9·42	0·02	20·67	23·62	16·07	7·55	6·9
1942-43 ..	340·62	2·26	342·88	..	..	342·88	42·90	1·77	44·67	6·78	4·45	9·42	0·02	20·67	24·00	16·07	7·93	7·0
1943-44 ..	340·62	2·26	342·88	..	..	342·88	42·90	2·14	45·04	6·78	4·45	9·42	0·02	20·67	24·37	16·07	8·30	7·1

* *Vide pro forma* accounts.

†First depreciation charge after 3rd year of running.
Increased debits due to adoption of "straight line" method of computation in place of "sinking fund" method hitherto sanctioned.

‡Guarantees for Jaitley's licence are omitted from this year onwards.

§Rupees 85,000 for coal for Chandausi Stand-by Station—probable average cost is included from this year onwards.

APPENDIX-V-B

A note on Rural uplift—Irrigation

1. There has been a good deal of vague talk recently in the papers and elsewhere about so-called rural uplift. Apart from loose generalities, I have seen no concrete proposals put forward to improve materially the condition of the villager. It is easy to suggest such steps as improved sanitation, improved manuring, filling in pits (often by digging others), establishing birth control clinics, lectures on improved village life and other such activities. But in my opinion the only *real* way to improve and " uplift " the village is first of all to put some *more money* into the villagers' pockets either by introducing some new industry or by improving *in a material* way the existing means and process of production. 95 per cent. of villagers live on the land and their condition can only be improved by either increasing the yield of the land or by reducing the cost of production and/or of transporting the produce to market. Vague forms of " uplift " such as those suggested above are in other words meaningless unless they are based on the material improvement of the villager in the matter of agriculture.

2. This in my opinion is where the Irrigation Department and Hydel come into the picture, in joint company with the Agricultural Department.

(*a*) In connection with the new cheap type of State tube-wells selling water and manure on volumetric principles, irrigation has been cheapened and extended as a means of (i) improving yield of existing crops, (ii) enabling more crops to be grown in the village and (iii) enabling crops of greater value to be grown such as long staple cotton and improved canes. Thus the electrified tube-well does in effect improve the material outlook of the villager.

(*b*) Electricity has become available at the village and tube-well transformer point as a means of processing the crop *locally*—within the village—so that the enhanced profits not only of growing extra crops, but also of turning them into the manufactured article can also accrue to the villager. This definitely puts more money into his pocket and gives him a new interest in production. The introduction of village sugar crushers and centrifugals, cotton gins and oil pressing *kolhus* definitely makes this possible. The cheap rate of 1 anna per unit which we charge for agricultural processes must encourage these means of processing grain, being 33 per cent. cheaper than the industrial rates charged in the towns which are themselves admittedly cheap.

3. Thus we can fairly contend that the hydel-*cum*-tube-well scheme confers a material benefit on the village and is the best form that the so-called " uplift " can take. It is real and tangible and forms a substantial basis on which to found other forms of secondary uplift.

It has been arranged that the additional staff necessary to operate this wide-spread system of electric irrigation will also be utilized as demonstrators for improving local agricultural methods by more scientific irrigation and manuring, better consolidation of holdings and better treatment of the soil. The activities of both the Agriculture and Irrigation staffs are being jointly directed to this end. Tube-wells are being divided into groups, each supervised agriculturally by a skilled officer and technically by a trained canal official. A system of liquid fertilization is now being tried by which the cultivator can purchase his water after impregnation with a suitable fertilizer in solution to the degree necessary for the particular local soil. This system is capable of vast extension if found practically feasible. The value of the State tube-well in providing a source of pure drinking water free from local pollution at thousands of villages in the Grid area should not be overlooked.

It is our objective that the State tube-well should become the local point for real village uplift. That it should form a centre for mutual effort towards not only the betterment of the crop, but the happiness of the cultivator. Drinking and bathing facilities for men and cattle are being provided at 1,500 wells in the electrified area. Loud speakers are being installed where the cultivator can sit under trees and listen to the news of the day and information about prices and rates. Disruptive voices will, we believe, be shortly stilled by the hum of electric motors at 1,500 points where, by true co-operation, the villager can be placed a little further from the abyss of hunger and discontent.

A combined steam electric power net-work and irrigation pumping scheme is now being matured on these lines for the consideration of Government and will be placed before the Legislative Council, if approved, in due course.

Such a project, if successful, would, apart from its intrinsic local importance, demonstrate the feasibility of similarly electrifying other districts where a supply of low lying river water exists and where suitable geological conditions can be obtained for State wells in areas remote from the rivers. The importance of these developments on the future welfare of the province cannot, I submit, be over-estimated. The intervention of cheap power through the development of the resources of modern engineering, opens out a new vista of hope not only for the minor urban industrialist but also for millions of cultivators who are at present living perilously close to starvation due to lack of facilities for growing adequate crops.

4. As regards the question of increased production, it has long been realized that unless we take steps to encourage the better fertilization of the local soils, there is grave danger of exhaustion of the soil by the cultivators repeatedly taking out rich crops which deplete the soil resources. This danger tends to be increased by cheap irrigation as temptation to grow the more valuable crops more cheaply is greater. Hence the Irrigation Branch and Agricultural Department in conjunction are endeavouring to counteract this by organizing the cheap sale of manures both natural and chemical. The tube-well operator keeps a

stock of manure at cost price the sale of which is encouraged by propaganda and also by demonstration. It is suggested that lower water rates should be offered to cultivators using a minimum quantity of fertilizer per acre. This is being investigated.

The consolidation of holdings is being encouraged so that a cultivator can supervise his field operations with less effort and expense. Consolidation also involves the purchase of less water at the well as the aggregate loss by percolation in transit to the fields is less.

Better systems of tillage are being taught at the demonstration centres. Land is being levelled so that fields take less water. The system of trenching for sugarcane planting is being encouraged.

A system of liquid fertilization is also being tried out at two wells and will be reported on at length after the current season.

My general idea is that each tube-well apart from being a village irrigation and industrial centre should also be a social and hygienic centre taking the place of the village "*chopal*".

(*a*) We have already installed a high candle power light at each tube-well transformer and this burns free of charge as an advertisement. 100 watt = 75 C. P. lamps have been installed at every tube-well.

(*b*) We have started the planting of trees at the corners of the existing 50′×50′ plots. Incidentally these plots are not big enough and we must go in for 100′×100′ at once to give more room for the activities mentioned below.

A *pilkhan* tree should be planted clear off the transmission line but otherwise as centrally in the plot as possible and under this a *chabutra*, say 20 feet diameter but giving space for the tree to expand should be built. An alternative is to locate the operator's hut, the manure godown and a covered end verandah "*chopal*" in one building, with an extended platform projecting under the *pilkhan* tree. Designs are wanted for these types.

(*c*) Drinking water facilities should be provided by a $\frac{3}{4}$″ pipe from the rising main fitted with a tap and a brick pavement below. This could be fixed against the side of the well or if preferred at a more central hydrant where more people can get at it. Taking water from the gauging tank or *gul* should be discouraged as it is liable to infection during epidemic.

We should also require an overhead tank covered with a tiled or malthoid roof, to hold one day's supply for the average village, say 300 people at 5 gallons = say 1,500 gallons supply. This tank and pillars to be paid for out of uplift grants. The tank would be filled in 2 or 3 minutes running of the well pump once daily when the well is not running for irrigation.

(*d*) A bathing tank for people should be installed on or beside the *gul* just below the gauging tank. Designs are wanted for this, but I suggest a pond lined with flat bricks in lime, cement pointed, with 1 : 1 sloping sides, 3 ft. deep at one end for children sloping to 5 ft. at the other, and about 20 ft. long. It should be possible to draw the water off this for

cleaning, hence it should be sited at as high a level as possible, if necessary above the *gul* level. Designs for this are invited from all concerned. It would be better to keep the bathing tank off the *gul* if possible as otherwise the *gul* water which is liable to be drunk lower down, will become infected in times of disease. This should be studied.

(*e*) Then there is the question of cattle watering and bathing. For watering we have provided a number of troughs at different wells the cost of which has hitherto been subscribed by various officers. We should not do any more of this by private charity but should encourage " uplift " by providing a cheap State trough at every well, also at points where tube-well *guls* intersect important roads. A cheaper type of trough should be designed. It ought to be possible to make one for Rs.50 instead of Rs.100.

As regards cattle bathing, we should proceed in two ways:

(1) Near the well an ordinary *kutcha* wallow can be dug and filled periodically from the *gul* by the operator. Cattle would ordinarily come and wallow in this pit.

(2) Alternatively we can fill up small village tanks from the *gul* at cheap rates say half rate to be charged on the gallons used. This could be done at times of little irrigation demand when there is naturally energy and water to spare. Between February 28, when *rabi* demand ceases and April 15, when sugarcane first watering begins there is always a period of slack demand. Operators should prepare a list of all village tanks within the tube-well command and an officer should be deputed to compute the number of hours running required to give a bathing supply within all these tanks. The hours running necessary to fill them should be posted at each tube-well. Hence an account could be kept of the amount of water and units used for such purposes. This will check sales and prevent corruption on the part of the operators in their irrigation accounts.

(*f*) Gramophones fitted with amplifiers are being bought for installing in the *chopal* or on the roof of the well house. The records will deal with such questions as rates of water and quantities necessary for each crop, suitable manures for different soils and quantities necessary, methods of purchase, improved tillage, levelling plots, types of cane seed locally suitable, etc. To ring the changes song and story and news records can be put on alternately. Ideas are invited.

W. L. STAMPE,
Chief Engineer, Irrigation Development,
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CHAPTER VI

Organized State-aid for the development of the Handloom Weaving Industry (Cotton) by R. T. Shivdasani, Esq., I.C.S., Director of Industries, United Provinces

In 1934 the Government of India set apart 5 lakhs of rupees per year for 5 years for the development of Cotton Handloom Weaving Industry. The United Provinces Government received Rs.1,04,000 for the 17 months ending March, 1936. The grant for the current financial year is Rs.86,400. With the help of this grant, the Industries Department have undertaken a comprehensive scheme for giving organized State-aid to the weavers. This scheme consists of:

(*a*) survey of the Cotton Handloom Weaving Industry,

(*b*) organized State-aid for the development of the Handloom Weaving Industry, and

(*c*) sole buying agency scheme.

1. *Survey*—15 surveyors were appointed for about 8 months in 1935 to collect statistics all over the province regarding the number and types of looms, number of weavers (part-time and whole-time) and the consumption of yarn, etc. Their reports also deal with the different systems in operation for the supply of yarn to the weavers and for the marketing of their products. They have also collected samples of different types of handloom cloth. The cost of survey amounted to Rs.30,756-14-6 out of which Rs.17,719 was met from the Government of India Grant.

2. *Organized State-aid*—This scheme aims at an all round assistance to the weavers more or less on the lines on which work was already being done by the department:

(i) *Collection of Samples*—The workmanship of the weavers and the printers in the province is already fairly efficient, and their primary difficulty is lack of proper marketing facilities. As a first step, therefore, samples have been collected of different types of fabrics made by the weavers. A number of these have been approved and graded. Some of the samples have been sent to the Central Weaving Institute, Benares, for modifications to suit the market. Some original and improved designs have also been prepared at the Institute. Selected samples have been collected in sample cards giving specifications and prices.

(ii) *Commercial travellers*—These samples have been given to 8 rural and 4 urban commercial travellers, who have been canvassing for orders both in towns and in village markets. Apart from securing business, these commercial travellers will assist in indicating the requirements of consumers of different markets ; and the weavers will be instructed to produce goods accordingly.

3. *Designs*—The popularity of the handloom product is based not only on their cheapness and durability, but because one can get a large variety of products on the handlooms, whereas the mills have necessarily to produce large quantities of a limited number of designs. For this reason it is necessary to keep on evolving new designs and adapting old ones to modern requirements. Separate designers have, therefore, been appointed for weaving and for printing work. Provision has also been made for meeting the losses initially incurred by weavers in undertaking the execution of these new designs both in the process of manufacture and on account of the failure of some of the designs to find a sale in the market.

4. *Research and Experiments*—The appliances and processes generally used by the weavers, dyers and printers are mostly still old-fashioned and uneconomical. Provision has, therefore, been made for (*a*) special staff consisting of a research assistant, (*b*) 2 master weavers and other staff to do research work at the Central Weaving Institute, Benares, and at the Dyeing and Printing School, Cawnpore.

5. *Finishing and Calendering*—One of the chief difficulties in getting a good price for the products of the handloom weavers is the lack of finish in appearance, as finishing machinery and appliances are expensive and beyond the means of weavers. Provision has been made to give grants to persons who are setting up calendering and bleaching plants in 3 or 4 different centres in United Provinces.

6. *Stores and Supervision of Manufacture*—In order to instruct the weavers in the use of improved methods and appliances and to assist them to prepare goods of new designs, it is proposed to utilize the agency of demonstration parties attached to Model Weaving Schools. These demonstration parties might shortly be substituted by tuitional classes according to the proposals of the Industries Reorganization Committee's Report. In addition to these demonstration parties, stores have been set up at six centres—Sandila, Bara Banki, Tanda, Mau, Etawah and Amroha. These stores will be in charge of skilled supervisors, who will demonstrate the use of improved looms and appliances to the weavers and supervise the execution of orders according to specifications. The stores will arrange for cheap finance from co-operative banks for helping weavers who form themselves into co-operative societies. The stores will also arrange for the supply of raw materials and sale of cloth through the Central Marketing Organization. The stores will thus serve as a link between the weavers and the market.

7. *Provincial Marketing Organization*—A provincial central marketing organization has been started to organize the marketing of handloom products. For the present, the Central Marketing Organization has been started as a section of the United Provinces Arts and Crafts Emporium at Lucknow for both wholesale and retail business. This section is a self-contained organization in charge of an Assistant Manager under the general supervision of the Business Manager of the Emporium. It was opened by Lady Haig on 27th November, 1935. In barely 4 months upto 31st March, 1936, it has done business in

handloom products amounting to Rs.34,377-8-6. This section also controls the work of the commercial travellers and the stores, thereby co-ordinating production with marketing. Apart from securing business in United Provinces, the Marketing Organization has participated in various exhibitions outside United Provinces in order to extend the markets for the United Provinces Handloom Products.

8. *Sole Buying Ageney Scheme*—The weavers are usually too poor to be able to hold on to their stocks and on account of their need for immediate cash it has been difficult to induce them to deposit their manufactures with a sales organization. Sole buying agents are, therefore, being appointed for purchasing a particular line of goods as soon as they are made. Such agents will be given a suitable subsidy on a sliding scale depending on the value of the goods purchased. Such agents will be under an obligation to purchase all the goods produced, provided they are to standard and not to make purchases of similar articles from others. To begin with, the sole buying agents are being appointed for buying the products made by co-operative societies of cottage weavers which number about 30.

9. *Conclusion*—Briefly, the scheme consists of a survey ; collection of samples ; evolving of new and improved designs ; researches and experiments for improving the appliances and processes for weaving, dyeing and printing ; stores for instructing weavers in improved methods of work ; setting up small calendering plants for improving the finish of hand-made products and provision of marketing facilities through commercial travellers, central marketing organization and sole buying agents.

The item-wise expenditure involved in the above scheme will be seen from the following statement :

		Requirements during 1934-36.
		Rs.
1.	Survey	.. 17,719
2.	(i) Collection of samples	.. 3,000
	(ii) Commercial Travellers	.. 7,590
3.	Designs	.. 7,280
4.	Researches and experiments	.. 4,500
5.	Finishing	.. 40,000
6.	Stores and supervision of manufacture ..	.. 16,588
7.	Provincial marketing organization ..	.. 7,247
8.	Sole buying agency	.. 200
	Total	.. 1,04,000

APPENDIX VII

Programme of road construction and reconstruction in the United Provinces to be financed from the Road Development Fund.

In a statement submitted to the Council in March 1935, the outlines of the road reconstruction programme, and the more important considerations which influenced its preparation, were explained. Briefly, it may now be re-stated that the ordinary water-bound road cannot bear the strain of motor traffic which, year by year, is increasing in volume and intensity. The change in the general mode of passenger travel from horse to motor is almost complete but the bullock-cart as a means of transportation of agricultural produce and other material both in urban and rural areas is still a large factor in determining road policy in many localities. The depth of metalled crust on some roads has been reduced to such thinness that, unless it is thickened, they will cease to be metalled roads. In some places traffic conditions are now such that they require stronger and more durable surfaces to sustain the loads all the year round. Among the most urgent needs of the roads in the province are: (i) the thickening of the crust of certain roads, and (ii) the reconstruction and modernization of certain others. Construction of new roads, however, desirable, increases our responsibility for providing additional funds for maintenance which must be met either from provincial revenues or with the approval of the Government of India, charged to the Road Account. The province can ill afford additional maintenance charges from its own revenues, and it is not desirable, except in special cases, to reduce our receipts from the Road Development Fund by diverting part of that income to meeting the maintenance cost of new construction. But every endeavour has however been made to include in the programme, as far as possible, the construction of new roads and the provincialization and reconstruction of important local roads. The Government of India have accepted the proposal, strongly urged in June last in the Council, that the additional cost of maintenance resulting from the construction of new roads or from the provincialization of certain local roads should be debited to our income in the Road Development Fund, at least for a term of five years.

The total cost of the projects included in the programme to which the Government of India have accorded their approval amounts to Rs.90·69 lakhs. The construction of the Moradabad-Bijnor road has not, as yet, been agreed to by them, but the local Government have made a strong representation to the Government of India for reconsideration of the case of this road. Their reply is still awaited.

The local Government have approved detailed estimates for Rs.81·25 lakhs in all. Schemes estimated to cost Rs.14·88 (including in this the approximate cost of constructing the Moradabad-Bijnor road) are under preparation. The total cost of carrying out the proposed

programme will be approximately Rs.96·13 lakhs, but, as the Government of India have generously contributed a sum of Rs.9·54 lakhs from their own reserve towards the cost of constructing certain roads, the net cost to be charged to the local Government's share in the Road Account will be Rs.86·59 lakhs, assuming that the construction of the Moradabad-Bijnor road (which is estimated to cost Rs.7·2 lakhs, including the feeder road from Nehtor to Haldaur railway station) will be agreed to by the Government of India. Funds to the extent of Rs.13·0 lakhs have been allotted during the current year, and it is proposed to allot Rs.17·28 lakhs during the year 1936-37. The balance available in the Road Account at the beginning of 1937-38 will be Rs.1·28 lakhs. To continue the programme to completion after 1936-37, an additional sum of Rs.56·60 lakhs will be required, and the method whereby the remainder of the programme is to be financed will have to be considered in due course.

The main outline of the programme is given in the following statements :

Name of road	Mileage	Estimated cost	Districts affected
I—Reconstruction or reconditioning of provincial roads		Rs.	
Grand Trunk..	116	7·89	Benares, Allahabad, Cawnpore, Farrukhabad, Mainpuri, Etah, Aligarh, Bulandshahr and Meerut.
Delhi-Mussoorie	81	7·45	Meerut, Muzaffarnagar, Saharanpur and Dehra Dun.
Meerut-Bareilly	44	1·53	Meerut, Moradabad and Bareilly.
Saharanpur-Ambala	7	·76	Saharanpur.
Dehra-Dhaki and Hardwar-Badrinath	9	·73	Dehra Dun.
Muzaffarnagar-Bijnor	5	·61	Muzaffarnagar.
Meerut-Bulandshahr	23	·82	Meerut and Bulandshahr.
Bombay-Delhi	16	1·48	Muttra and Agra.
Agra Cawnpore	26	1·91	Agra a d Mainpuri.
Agra-Aligarh	31	2·42	Agra and Aligarh.
Agra-Fatehpur-Sikri	2	·25	Agra.
Firozabad Railway feeder ..	·5	·08	Do.
Taj Road	1	·11	Do.
Fatehabad Road diversion ..	2	·23	Do.
Agra-Etawah-Auraiya	68	2·89	Mainpuri and Etawah.
Bareilly-Muttra	8	1·44	Etah, Aligarh, Muttra, Budaun and Bareilly.
Lucknow-Jhansi	56	7·45	Lucknow, Unao, Cawnpore and Jalaun.
Cawnpore-Hamirpur-Saugor ..	12	1·21	Cawnpore.
Bareilly-Etawah	15	1·18	Farrukhabad, Etawah and Shahjahanpur.
Etawah-Gwalior	3	·21	Etawah.
Khanderao Gate, Jhansi	1	·31	Jhansi.
Jhansi-Shivpuri	1	·19	Do.
Fatehpur Saugor	2	·29	Fatehpur and Banda.
Fatehpur Cawnpore	1	·13	Farrukhabad.
Station roads, Cawnpore Division ..	7	·48	

Name of road	Mileage	Estimated cost	Districts affected
		Rs.	
Bareilly-Ranikhet	37	1·64	Naini Tal Bareilly.
Lucknow-Gorakhpur	72	5·06	Lucknow, Bara Banki, Fyzabad, Gonda, Basti and Gorakhpur.
Lucknow-Bareilly	20	4·36	Lucknow, Sitapur and Shahjahanpur.
Lucknow-Benares	31	1·59	Lucknow, Partabgarh, and Jaunpur.
Sitapur-Bahraich	21	1·61	Sitapur.
Station Road, Lucknow	3	·15	
Allahabad-Fyzabad	7	1·10	Fyzabad and Sultanpur.
Allahabad-Gorakhpur	43	2·27	Azamgarh and Gorakhpur.
Fyzabad-Bahraich	33	2·12	Gonda and Bahraich.
Bahraich Railway feeder	..	·20	Bahraich.
Station Roads, Gorakhpur ..	3	·14	Gorakhpur.
Benares-Sarnath	4	·34	Benares.
Gorakhpur-Ghazipur	2	·18	Azamgarh.
Station roads, Benares Division ..	2	·12	
Allahabad Link	2	1·05	
Total ..	847·5	63·98	
II—Reconstruction of local roads provincialized			
Muttra-Gokul-Baldeo	13	1·49	Muttra.
Muttra-Brindaban	6	·46	Do.
Nandgaon-Barsana	5	·15	Do.
Sikandrabad-Dankaur	4	·52	Bulandshahr.
Gonda-Balrampur	12	·94	Gonda.
Benares-Ghazipur	41	·95	Benares and Ghazipur.
Mirzapur-Jaunpur	24	1·47	Jaunpur and Mirzapur.
Auraiya-Phaphund	13	·82	Etawah.
Allahabad-Rewah	27	3·75	Allahabad.
Total ..	145	10·55	
III—New roads			
Roorkee-Hardwar	9	1·83	Saharanpur.
Kaman-Nandgaon	4	·35	Muttra.
Auraiya-Bhognipur	80	2·23	Cawnpore and Fatehpur.
Bhognipur-Kora-Jehanabad ..		3·40	
Kora-Jehanabad to Bindki ..		2·78	
Moradabad-Bijnor	42	7·20	Moradabad and Bijnor.
Total ..	135	17·79	
IV—Bridges			
Bridge over Sai	..	1·50	Jaunpur.
Akbari bridge, Jaunpur	27	·30	Do.
Level crossing. Rosa. Approaches to—	..	·37	Shahjahanpur.
Total ..	..	2·17	
V—Purchase of rollers	..	1·64	

Proposals to be approved by Government of India.

Name of road	Mileage	Estimated cost	Districts affected
VI—Works for which Government of India have promised contribution	Amount of contribution	Rs.	
1. Sikandrabad-Dankaur road ..	Half	·40	
2. Railway feeder roads, Firozabad and Bahraich.			
3. Construction of road from—			
(i) Auraiya-Kora-Jehanabad ..	Half	4·25	
(ii) Kora-Jehanabad to Bindki..			
4. Auraiya-Phaphund	Half	0·41	
5. Allahabad-Rewah	Full	3·75	
6. Nandgaon-Kaman	Do.	·35	
7. Bridge over Sai, Jaunpur ..	Do.	·38	Approximate.
Total ..	..	9·54	

To summarise, the programme is—

	Rs.	
(i) to reconstruct and recondition 848 miles of provincial roads at a cost of	63·98	lakhs.
(ii) to provincialise and reconstruct 145 miles of local roads at a cost of	10·55	,,
(iii) to construct 135 miles of new roads at a cost of ..	17·79	,,
(iv) to construct new bridges and to repair an old bridge	2·17	,,
(v) to purchase road rollers for the execution of work ..	1·64	,,
Total ..	96·13	,,

The total length of roads proposed to be constructed and improved is 1,128 miles and the total expenditure proposed to be incurred is Rs.96·13 lakhs.

Works carried out during 1935-36

The work during the current year had to be limited mainly to the collection of material. The actual work of reconstruction is in hand in Meerut District on the Ghaziabad-Bulandshahr road, on the Lucknow-Bareilly road in Sitapur and Shahjahanpur Districts, and on the Lucknow Jhansi road in Lucknow District, on the Meerut-Bareilly road in Bareilly District, on the station roads in Gorakhpur and Bahraich and on the Grand Trunk road in Benares and Cawnpore Districts.

APPENDIX VIII

Note on the results of afforestation of the Jumna and Chambal ravines by Mr. Debi Lal Sah, B.A., M.Sc., Afforestation Division, Cawnpore

1. *History of afforestation*—In order to understand the afforestation work in the Jumna and Chambal ravines and to judge its results, it is necessary to know the history and aims of this afforestation. It was generally known that there are extensive waste and ravine lands along the Jumna and Chambal rivers. The question of utilizing these waste lands was the subject of a report as early as 1879 but no definite action was taken in the matter for nearly 30 years. In 1890 in his report on Indian Agriculture Dr. Voelker laid down the necessity of creating fuel and fodder reserves. The subject was revived in the United Provinces Government resolution no. 348, dated 20th August, 1922, when a Forest Officer was deputed to make a survey of the most promising areas. After his report, a committee of officials and non-officials was appointed in 1913 to examine the various points raised in that report and to submit recommendations to Government. This committee recommended that it is most desirable that any measures considered practicable be undertaken to increase the productiveness of the ravine tract for grazing purposes and for the production of fuel but it was against the application of the Land Acquisition Act on any extensive scale when introducing the management of ravines in the Etawah district. In 1914, *vide* G. O. no. 175-L of 30th September, 1914, the Principal of Agricultural College, Cawnpore and a Forest Officer were appointed to report on the possibilities of an extended campaign of ravine reclamation and prevention of erosion as approved for the Etawah district and the scope offered in this direction for useful famine works.

2. *Aims of afforestation*—Originally it was only intended to improve the ravine lands for grazing purposes and for the production of fuel but various objects of management as given below were laid down by Government Orders or resolutions that were issued at intervals from 1912 to 1920 :

(i) To stop soil erosion in ravines, i.e., the scouring out of the beds of ravines and the washing down of their banks.

(ii) To stop further extension of ravines inland.

(iii) To prevent good soil being washed off the uplands and carried away down to the rivers.

(iv) To retain the rainfall in the soil and thus raise the water level.

(v) To make fodder reserves by growing grass (hay) for the local villagers and for export to other localities in famine years.

(vi) To provide good pasturage.

(vii) To provide firewood for the local villagers.

(viii) To grow firewood for export and sale at a profit.

(ix) To grow valuable timber for sale at a profit.

(x) To provide tan bark for the Cawnpore tanneries.

(xi) To break down the ravines with the object of making them suitable for agriculture or for the production of fodder.

(xii) For financial profit.

(xiii) To encourage zamindars to protect and manage their own ravines.

(xiv) As famine relief works.

Besides the above there were others too—such as creation of breeding ground for cattle, improvement of soil, etc.

3. *Natural vegetation in ravine land*—The natural vegetation of the ravine land has been destroyed by uncontrolled cultivation wherever the soil is fit for this, and by uncontrolled grazing, reckless destruction and by fires elsewhere. Large areas are now almost treeless but natural vegetation has undoubtedly been forest and is still forest except in *kankar* and *usar* soils. The vegetation is mostly of a xerophytic type and consists of small trees, thorny bushes and grass—the following being the most common and characteristic :

Trees	Large shurbs or small trees	Small bushes
Prosopis spicigera (*Cheonkar*).	Balanites aegyptiaca (*hingot*).	Capparis aphylla (*karil*).
Acacia leucophloea (*reonj*).	Dichrostachya cinerea (*khairi*).	Capparis horrida (*hins*).
Azadirachta indica (*neem*).	Zizuphus jujuba (*ber*).	Salvadora oleoides (*pilu*).
Acacia catechu (*khair*).	..	Adhatoda vasica (*arusa*).
		Zizuphus spp. (*ber*)
		Carissa spinarum (*karaunda*).

Acacia arabica is also found fringing the rivers, nalas and on moister localities, but seldom occurs in the arid ravine zone.

More important than trees and shrubs are the grasses. The most common grasses in the ravine land are Aristida hystrix and Aristida depressa both of which are practically worthless and are known as '*safed lampa*'. The more valuable grasses do exist even in the most heavily grazed localities under the shelter of some thorny bushes or in patches of uneven ground inaccessible to cattle.

4. *The afforestation work*—The work of afforestation of the Jumna and Chambal ravines was started in 1912 and continued for nearly 15 years during which period 11,992 acres of ravine land were planted with timber and fuel species. But towards the end of 1927 the work of

planting was given up on financial grounds and also due to the fact that the timber species in the newly planted ravines, though they started very well, did not come up to the original expectations. When afforestation was in full swing, the working of the soil was done thoroughly and systematically. Big *bundhs* were made on the bottom of some prominent ravines to store up water to keep the surrounding soil moist. Small earth dams were also made at the heads of the small ravines to stop a sudden run off of surface water and to stop further erosion there. Of all the indigenous trees of the area *babul* seemed the most attractive by reason of the demand for its bark for tanning and for fuel but as many as 42 other species were also tried. Both planting and direct sowings were attempted by the ridge and ditch method.

5. *Results of afforestation*—The afforestation policy started with so many different objects of management that complete success was hardly to be expected. Some of the objects overlap one another or are consequential of one or the other but the three primary objects were :

(1) to grow firewood and valuable timber for sale at a profit,

(2) to improve the pasturage and tree growth on the ravines and thus to establish fuel and fodder reserves, and

(3) to prevent the further erosion of ravines and to check the extension inland of the ravines.

(1) *Timber*—The object of growing valuable timber was really considered as one of the most important because it was on this that the chances of making the afforestation scheme pay were counted. The attempts so far made to grow valuable timber have been made with many species of trees and have been failures as the trees do not grow to a big size on account of the adverse climatic conditions and the kankar that is found in the subsoil in many parts of the ravine land. Though most of the species of indigenous trees are gregarious, yet their only chance of developing in such an unfavourable habitat is, according to Mr. Marriott, to stand alone or in pairs or trios—free from excessive root competition. Whatever the reason it is almost certain that the ravines will not produce a crop sufficiently dense to pay for its formation.

Fuel—It is now also definitely known that artificial plantation in the ravines for the production of fuel alone is financially unprofitable. In fact, it was never expected that the afforestation scheme could be made to pay out of the sale of firewood.

(2) *Improvement of fuel and fodder*—

Fuel—Although the indigenous forest is not worth much, it would be a mistake to overlook it altogether, for it is only these indigenous trees that are likely to do any good in these ravine areas. As far as village requirements of fuel are concerned, it can be safely assumed that the indigenous trees will more than suffice. The protection of these species from heavy grazing and reckless destruction has not only improved their growth but has also largely contributed to their propogation by natural regeneration. In fact there is hardly an acre where simple protection has not brought about the appearance of some of these trees.

Fodder—Where closure is applied to any ravine, area or when the grazing is controlled, the more valuable grasses oust the *safed lampa* and spread rapidly as a rule. After a few years of closure all the ground except patches of exposed kankar has been well covered with fodder grasses—

Andropogon feveolatus	..	*Murjhaina.*
Andropogon pertusus	..	*Chhoti jergi.*
Apluda aristata ..	..	*Bhanjura.*
Brachiaria ramosa	..	*Kirwai.*
Chloris barbata ..	..	..
Chloris rosburghiana	..	..
Chloris virgata ..	..	..
Cymbopogon parkeri	..	*Katauna.*
Dichanthium annulatum	..	*Bara jerga.*
Elausine aegyptiaca	..	*Marka.*
Eleusine flagellifera	..	*Ghur dub.*
Eriochloa ramosa..	..	..
Heteropogon contortus	..	*Kala lapa (lumpa).*
Ischaemum rugesum	..	..

When, however, one of these closed areas is reopened to unrestricted grazing the reversion to the original worthless *safed lampa* and the almost complete disappearance of the useful fodder grasses is very rapid.

(3) *Prevention of erosion and expansion of ravines*—

Experience has shown that controlled grazing or closure to grazing has produced excellent fodder reserves and has alone been enough to attain the object of stopping soil erosion in ravines and their extension. It is the grasses that really matter—not trees—as a preventive of surface run off of rain water and therefore of soil erosion. Observation has shown that wherever there is a thick crop of grasses, irrespective of the presence of shrubs or trees, no fresh erosion is visible in such areas while fresh erosion and slips are quite common in the unprotected areas where the ground is bare of grasses.

6. *Conclusions*—(1) Ravine management and prevention of extension of erosion in ravines are simply questions of control of grazing and improvement and preservation of grasses. Closure to grazing or controlled grazing enormously increases the quantity and quality of fodder grasses and indigenous trees or shrubs, and encourages their natural regeneration and effectively prevents soil erosion and the extension of ravines.

(2) It is usually mere waste of money to attempt to introduce valuable timber or fuel species as due to various adverse factors the trees do not grow to a timber size or to a sufficiently dense crop, and as by simple protection (either departmentally or by co-operative societies or village *panchayats*) and almost without any expenses it is possible to improve the indigenous fuel species and encourage their natural regeneration.

(3) Whenever a protected area is opened to continuous or unrestricted grazing, the reversion of the indigenous trees to their original state and the reversion to the original worthless *safed lampa* and the almost complete disappearance of the useful fodder grasses is very rapid.

(4) Regulation of grazing and cultivation at and around the heads of the ravines is absolutely necessary to prevent the extension of ravines. The heads of ravines are often outside the boundary of land taken up for afforestation and some time in the middle of the cultivated land. It was the difficulty of dealing on a large scale with such places that caused Government practically to give up the idea of ravine reclamation as early as 1920 (*vide* G. O. no. 1503/XIV—142 of 9th September, 1920).

(5) The construction of large masonry *bundhs* to store up water for keeping the soil moist does not justify the expenses involved. However, small earth dams made at the heads of ravines to stop surface run off of rain water are useful in preventing soil erosion and in silting up of the shallow newly formed ravines.

APPENDIX IX

Note on Rural Education by R. H. Saloway, Esq., I.C.S.

Very powerful tuition and propaganda can be done by modern mechanical and optical science, in the form of travelling cinemas, magic-lanterns, and gramophone records. This is a subject which I have personally tried out to some extent and with most encouraging results. Ultimately I think the cinema will supersede the magic-lantern to a great extent and there is practically no form of propaganda which does not lend itself to vivid representation by the cinema. For myself I have always used the 16 mm. (or sub-standard) apparatus, both as being much cheaper and as being better designed for remote *dihat* work. It will accommodate an audience of up to about 500 which is ample for most occasions and creates and holds the interest of an audience as nothing else can. Films have already been made and are at once available on about a dozen different subjects of which sugarcane, killing field-rats, child-welfare, dangers of disease from the house-fly, horse-breeding, dyeing, printing and weaving and the hyde grid are a few.

Further films are under preparation including one on rinderpest.

These films and suitable apparatus to go with them have been supplied to a number of publicity vans in the United Provinces and are in regular work. A new development which promises much is the publicity bullock cart. This too is provided with a tiny self-contained cinema outfit and can go anywhere into the *dihat*. It has the new Dunlop pneumatic equipment so that the cart itself is a valuable exhibit.

With these an important and most useful item of equipment is the gramophone with special " uplift " songs and dialogues. These can be either complete in themselves or arranged to be played before or after certain films to provide additional instruction.

Wireless reception apparatus is, at present, of doubtful value as a means of propaganda, though it has great possibilities. At present it suffers from the fault that it has to receive only what is available and that may not be suitable to the time and place.

Only when good programmes of interest and value are " on the air " regularly will the instrument be useful. It collects a crowd but that is about all at present. When fitted with a loud-speaker it can be arranged, however, to play gramophone records with great volume of sound and can also be arranged to amplify the lecturer's voice in the same way. These two points are very useful.

Few people seem to understand the basic idea of village propaganda. Some people think it is merely to provide the villager with a free *tamasha*. This is wrong. Others think it consists in standing on a platform and delivering speeches of incredible length. This also is wrong. The idea is to improve the villager's knowledge of improvements and to set him on the road towards effecting his own improvements. His interest must be maintained, and to that extent only the thing is a *tamasha*.

If he is interested he will remember the information, if he is bored he will forget it.

The whole idea is tuitional and with tuition must be combined the keenest interest. I suggest that at least one of these publicity or propaganda units should be formed for each district and that it should spend its whole time touring steadily and slowly round the district, being present specially at fairs and markets, but at all times working steadily. It would spend two or three days at a village, then move on five or six miles, stay another couple of days, move on again, and so on.

It should consist of a pneumatic-tyred bullock cart or perhaps two carts, containing a self-contained cinema unit (16 mm. size), magic-lantern, gramophone and large selection of records, also perhaps a wireless set with loud-speaker attachment which could be used either for the gramophone or for the lecturer.

Cinema films of various activities will prove less bulky than models, but a few models can be carried as necessary. There is no limit to the useful production of cinema films and there is no department that would not gladly take the chance to show its activities to the public in this way. Probably every department would be willing to contribute something to the cost. Here are a few suggested subjects—Forestry, planting and tending young forests,—production of fodder grasses in forest land,—uses, felling, and seasoning of timber. Bye-products, resin, lac, etc. Catechu making and extraction (a film on this will shortly be ready). Veterinary—Breeding, care of bulls, management, advantages of good crosses,—Rinderpest prevention and symptoms (this will soon be ready too). Foot and mouth disease, preventing measure, segregation. Correct fodder, examples of correct diets and bad results of incorrect diet. Good stable management—Cleanliness. Simple ailments and injuries and their cure. Dairy farming—milk yields of various varieties, treatment of milch cattle, cleanliness, simple sterilization,—marketing the produce. Making butter, cream and ghee. Agriculture—Sugarcane (this has already been done and the film is in wide circulation). Special fodder crops and how they should be cultivated. Ensilage.

Farmyard manure, its recovery and application. Detailed films on various crops, barley, wheat, oats, kharif crops, cotton, etc. showing improved varieties and special treatment. Improved varieties of agricultural implements and machinery. Retention of rain-water supplies. Checking of soil erosion. Irrigation—discouraging waste of water, showing best water-lifts for different conditions, explaining the work of the canals. Quantities required for different crops and bad effect of excessive irrigation in order to conserve water supplies.

Co-operative Societies,—showing differences of individual and collective work and advantages of the latter as applied to various village activities.

Sanitation—Elementary cleanliness—dangers of filth, flies and dirt (a film on this is in circulation), how to dispose of refuse to the advantage of the fields.

Better general health—causes and prevention of certain common and dangerous diseases, plague, cholera kala-azar, smallpox, etc. Advantages of inoculation.

(*N.B.*—The Public Health Department have certain films of this type already, but only in full size 34 mm. in most cases.)

Village Industries—Bee-keeping, poultry-farming, fruit growing and preservation, pottery, motor-mechanics' work, basket-work, brass-ware, market-gardening. Kindness to animals. Peaceful compromise of disputes instead of expensive litigation.

Economy-saving expense on social ceremonies, evils of debt, mutual trust in co-operation and so forth without limit.

Each cinema outfit should normally carry a full stock of films and should show them according to the needs of the area concerned. As the outfit is always moving, a new audience is obtained every day and steady change of films and lantern slides is not required. Production of new pictures should continue steadily and all outfits should be kept fully up-to-date in their supplies.

A circulating film library will not be of use, as it is the outfit that circulates and the films can therefore remain without much change.

Similarly series of lantern slides should be prepared for various subjects, with carefully written lectures so that the lecturer may clearly and attractively explain his points. Gramophone records should be specially made to dovetail in with the pictures.

The outfit would have to be in charge of a competent mechanic, at about Rs.40 or Rs.45 per month, who would be fully responsible for the apparatus. The pneumatic-tyred carts would themselves be an exhibit and they should be drawn by special specimen bullocks, which will be another exhibit. The lecturer would probably be an assistant surgeon who had had some training in lecturing and who could understand his various subjects, as well as looking after a travelling dispensary attached to the outfit. When possible the services of specialists should be engaged for lecturing.

The Red Cross and the Public Health Department have certain films, but I think they suffer from one grave defect. It is that their films lack variety. They are all on subjects of health, which gets uninteresting after a time even to a villager. The proposed outfit just described would have wide variety of exhibits, and would have something for every taste. It would be educative, interesting and would have its full propaganda value. The Public Health Department outfits also are comparatively large and heavy and on motor vans and cannot fully penetrate the *dihat*, though they are of a great value along roads.

The outfits would carry stocks of selected leaflets and also exact information as to where fuller information could be obtained on any point and it would be the duty of the man in charge at once to put any enquirer into touch with the right officer who could help him.

All films and pictures must be made in India, as such products have far greater appeal to the villager than even the best foreign films.

In my opinion the logical department to undertake this work is that of Publicity. In my opinion the subject has nothing to do with Reforms, in so far as they are political, and the word " Reforms " should be dropped.

There is more than enough work for a full-time officer and the importance of the work is such that, in my opinion, a fairly experienced I.C.S. man should be appointed to the job and required to do some six months in the year touring to see how the job was getting on.

Some funds will be needed, but if bullock-carts are mainly employed instead of motor-vans, the cost would be heavily cut.

It would probably be better to re-construct the present Publicity and Reforms Department as one of Rural Reconstruction, following closely on the lines of the Punjab.

APPENDIX X

Questionnaire by the Committee of the Board of Economic Inquiry, United Provinces, on Economic Planning

MEMBERS

1. KHAN BAHADUR MAULVI MUHAMMAD OBAID-UR-RAHMAN KHAN, M.L.C., *Aligarh (Chairman)*.
2. DR. RADHA KAMAL MUKERJEE, M.A., PH.D., Professor, Lucknow University.
3. MR. M. L. GUPTA, M.A., B.COM., A.S.A.A., B.A. (LONDON), United Provinces Chamber of Commerce.
4. LALA HARI RAJ SWARUP, M.A., LL.B., Rais and Landholder, Muzaffarnagar.

DR. R. B. GUPTA, M.A., PH.D., *Statistician (Secretary)*.

THIS questionnaire is issued by the Committee of the Board of Economic Inquiry to draw up a plan of economic development for the United Provinces with a view to elicit information, opinions and suggestions. The questions are not exhaustive, nor it is expected that all the questions should be answered.

Persons or Associations who may be willing to help the committee by separate notes or memoranda on any subject referred to in the questionnaire and with which they are intimately connected, are invited to do so.

All papers should reach Dr. R. B. Gupta, Secretary of the Committee, Nawabganj, Cawnpore, before the 15th of April, 1935.

Oral evidence may be called for on the basis of and as required by the replies and statements received.

The committee desire to collect information from all parts of the United Provinces. Persons not already supplied can obtain copies of the Questionnaire from the Secretary.

OBAID-UR-RAHMAN KHAN,
Chairman,
Committee, Board of Economic Inquiry,
United Provinces, on Economic Planning.

I—Organization

1. In what respect do you think the development work in Government department may be pushed forward and co-ordinated by a planned programme covering a period of three, five or more years?

2. How far are Government departments at present working independently along single lines or co-operating with one another in rural improvements?

3. What links and contacts between the villagers and the Government field staff do you think necessary for effective development?

4. What do you think should be the *area* of an economic attack co-ordinating together official and non-official forces, a village, a *pargana* or a *tahsil*? How would you select the area for development work in a district?

5. If it be a *pargana* in which every kind of development work might be pursued simultaneously under a plan, do you think that intermediate non-official *pargana*, *tahsil* and District Planning Boards should be organized acting in concert with one another under the Central Board of Economic Inquiry (and Planning)? How would you build these up?

6. How far do you think that the present Board of Economic Inquiry (and Planning) may serve as the central organization for urging and co-ordinating development work?

7. Do you approve of the appointment of a Commissioner of Rural Development as appointed recently in the Punjab and Bengal? What should be his qualifications and status and his relations to the Board of Economic Inquiry and to District Officers?

8. What Government departments or sections should be represented by the local field staff in each development centre?

9. What touring and inspecting staff, besides the local field staff concentrated in the development centres, do you think necessary?

10. In how many centres do you think that the developmental programme should be started to obtain an appreciable effect on the *morale* of the Province?

11. For how many years do you think the programme must be pursued in a particular centre, and then might be shifted to another area in the same *tahsil* or district?

12. How do you think should expenditure on the development programme be met? Do you approve of additional taxation for this purpose or do you consider that expenditure of such kind should be legitimately met out of loans?

13. How far, in your opinion, expenditure on development work is likely to be directly or indirectly remunerative?

14. Do you have any experience of the developmental work in Partabgarh? How would you improve on this programme for development?

II—Agricultural Improvement

1. To what extent do smallness and scatteredness of holdings impede agricultural improvement?

2. What legislative or other measures would you suggest to bring about consolidation of holdings?

3. What improvements would you suggest in the present system and machinery of distribution of (*a*) improved seeds, (*b*) fertilizers, and (*c*) modern agricultural implements among the cultivators? In what manner can peasants be assisted by the adoption of the hire-purchase system?

4. What is your experience or opinion as regards agricultural demonstrations arranged in the peasants' holdings under existing conditions as a method of introducing agricultural improvements?

5. To what causes would you attribute the recent decline of (*a*) the net cultivated area and (*b*) the double-cropped area in certain parts of the Province?

6. To what extent has the introduction of improved varieties of sugarcane recently tended, in the absence of fertilizers, towards greater soil exhaustion and lower standards of farming?

7. How far is the Cultivator obtaining the benefits of the fixation of minimum cane prices?

8. What are the causes and effects of the decline of cotton cultivation in some districts of the Province?

9. Have the expansion of rice, maize and sugarcane and the decrease of barley areas in the eastern districts been an unmixed good to the agriculturists?

10. What special measures of agricultural protection against increase of aridity do you consider necessary for the Agra-Muttra region? Is the problem there one of mere water supply or also of farming methods and practices?

11. How do you think fruit culture and market gardening can be developed systematically as a solution of the problem of under-sized holdings, especially in the eastern districts?

III—Cattle Improvement

1. In what areas of the province have the breed of cattle deteriorated most? What special measures of improvement of fodder supply and distribution of good breeding bulls do you consider necessary?

2. How do you think could cattle-breeding societies be effectively organized and encouraged?

3. In areas which suffer from fodder famines, what special measures are necessary for the improvement of fodder supply? Have any fodder surveys been undertaken with reference to cattle nutrition in years of drought?

4. To what extent have heavy yielding fodder crops been introduced in rotation with cereals and with what effects?

5. What have been the results of collective and uncontrolled grazing in the riverine areas on (*a*) the live-stock, (*b*) the fodder supply and (*c*) the land? How would you prevent over-grazing?

6. In what manner could the village *panchayats* or cattle-breeding societies be effectively employed for pasture management?

7. What improvements can you suggest in preventing or controlling cattle epidemics and diseases?

IV—Co-operation

1. In the face of the reverses of the co-operative movement in the province what steps would you take to bring about the right co-operative spirit in the villages? How would you create genuine interest of the cultivators in the movement?

2. Do you think that the shift of emphasis from co-operative credit to rural reconstruction has achieved or is likely to achieve better results?

3. What steps would you suggest for improving the supervision and for inculcating the principles of co-operation among the members?

4. In what new fields would you advocate an extension of the sphere of co-operation?

5. What is your experience relating to (*a*) the co-operative sale of agricultural produce and (*b*) co-operative artisans' societies?

6. Do you think that co-operation will solve the problem of agricultural indebtedness or that there should be some other method or machinery supplementary to it to reduce the burden of debts?

7. What do you think of Debt Reconciliation Societies as a machinery of adjustment of claims between debtors and creditors?

8. In what areas and on what lines would you establish land mortgage banks?

9. How would you create greater interest among the urban and middle classes in co-operation as an agency of economic uplift?

V—Industrial Development

1. What new subsidiary industries allied or supplemental to agriculture may be started usefully in the villages and what should be the function of the Industries Department in promoting these?

2. What in your opinion would be the most effective methods of advising village and cottage industries as regards: (*a*) improvement or reconstruction of processes, (*b*) introduction of new mechanical tools, (*c*) markets and (*d*) improvement of patterns and designs?

3. What further facilities do you think the cottage industrialists should be given in the grid area so that they may make greater use of hydel power?

4. What forms of Government assistance do you consider necessary for advertising and marketing the products of cottage industries?

5. How do you propose to reorganize the Arts and Crafts Emporium as the headquarters of a system of sale depots in industrial centres?

6. What large scale industries, besides textiles and sugar in your opinion can be successfully started in the province and what forms of State assistance would they require?

7. In what branches of industry do you think medium-sized establishments can thrive in the province? What special problems of (*a*) the supply of raw materials, (*b*) specialized labour, (*c*) industrial credit, and (*d*) marketing are they facing and what solutions do you propose?

8. How can we achieve a better distribution of industries in the province to bring factories nearer the areas of large population?

9. What are the present movements of labour in the areas with which you are familiar, rural-urban, inter-district or inter-provincial? What steps should be taken to assist or regulate the distribution of migrant labour?

10. Can you suggest any improvements in the present Stores Purchase Policy of the Government to help indigenous industries?

VI—Improvement of Roads and Transport

1 What steps should be taken to improve communications from one village to another and between villages, marts, metalled roads and railways?

2. What methods do you suggest for the development of motor transport and its regulation?

3. Do you think that light railways or tramways can be introduced to bring about rural industrialization and better agricultural marketing? What areas in your opinion are particularly suitable for such development?

4. Do you consider it advisable that road improvement in the countryside should be part of a planned regional programme of road construction? If so, into what regions would you divide the province for a scheme of road development?

VII—Urban Development

1. Do you think that the improvement trusts or municipalities in the United Provinces are taking adequate steps for opening out congested localities and for improving the sanitary conditions of the poorer quarters? If not, what steps would you suggest in this connexion?

2. Do you think that there is adequate provision in the towns with which you are familiar for playgrounds, gardens and parks for the recreation of men, women and children? If not, what steps would you suggest to provide these?

3. Are the improvement trusts and municipalities dealing adequately with the housing problem? In what manner can improvement trusts or municipalities, employers and employees co-operate for the improvement of housing conditions in our towns?

4. Do you consider that it is necessary to introduce rules and regulations relating to building and zoning of industries in certain district board areas? If so, how would you amend the District Board Act?

5. In what towns do you consider that the future development involves dealing with population, housing and transport problems in much larger units than are now represented by the existing municipalities? Do you approve of improvement trusts being constituted to cope with these problems?

6. Do you consider that the existing municipal by-laws relating to buildings, roads, and discrimination of residential and industrial areas are adequate and are properly enforced? What steps would you suggest for their enforcement?

7. What additional sources of revenue, are, in your opinion, available for municipalities in order that they may look forward to a future of development on modern lines without assistance from Government?

8. What kinds of welfare work do you consider necessary among the labourers in industrial centres? How far are the employers or non-official agencies of social welfare attempting these at present?

VIII—Rural Housing and Sanitation

1. Do you find congestion in village sites and huts in the areas with which you are familiar? What remedies do you propose?

2. What part in your opinion should Government play in improving the housing conditions in villages?

3. How would you improve medical facilities in the villages? Do you think that travelling dispensaries should form an important part in a campaign of rural medical aid?

4. In what respects should the work of the Public Health Department for rural sanitary improvement be expanded and strengthened by non-official agencies?

5. How could maternity and child welfare work be introduced with success in the villages?

6. In what areas do you think are the sources of drinking water inadequate or unwholesome? What special measures do you think necessary in such areas?

IX—Irrigation Development

1. In the south-western dry tract of the United Provinces, what steps should the Irrigation Department adopt to improve the agricultural water supply?

2. Have any systematic surveys of water levels and water-bearing strata been undertaken in Muttra, Agra and Etawah? Would the construction of state tube-wells be feasible in some areas in these districts?

3. Is a system of state open wells economically feasible in some areas in the south-western dry zone?

4. In the case of release of canal water from the Upper Doab through the construction of state tube-wells for the south-western dry tract, to what extent and at what levels could wells be run along with canals throughout the year or at defined intervals, or whether as alternatives or concurrently?

5. How far is it true that the average cultivator takes much more canal water than he needs? How would you prevent wastage? Could the present system be modified so that the quantity of water supply might be better adjusted to crops and field conditions?

6. Do you discern water-logging and salt encrustation in any area in the Sarda Canal zone? What steps would you suggest to deal with the problem?

7. Is any fall in the sub-soil water level discernable in the intensively irrigated areas in the well zone? Do you think that well surveys are desirable in the Central and Eastern districts of the Province?

X—Rural Afforestation

1. What steps might the Forest Department take to prevent a further increase of arid conditions in the south-western dry tract? What kinds of defensive vegetation may be propagated to check the encroachment of sands?

2. How could Government encourage the planting of village groves and forests by the *zamindars*?

3. What special and co-ordinated measures of reclamation and defence are necessary in the ravine stricken areas on the flanks of the Jumna?

4. In what other areas do you think soil erosion has been a serious evil? How could Government and non-official agencies co-operate in constructing field and ravine embankments to prevent excessive drainage?

XI—Removal of Illiteracy

1. What are the difficulties now being experienced in (*a*) municipal and (*b*) district board areas for introducing compulsory education among boys and girls?

2. What is the extent of absenteeism in your area? How far is absenteeism nullifying the effects of compulsion?

3. To what extent do you consider a system of peripatetic teachers, adjusted to local conditions and circumstances, feasible for removing illiteracy?

4. How can broadcasting help adult education?

APPENDIX XI

List of witnesses examined by the Committee on Economic Planning, United Provinces

LUCKNOW

1. P. M. Kharegat, Esq., I.C.S., Secretary to Government, Industries Department, United Provinces.

2. J. L. Sathe, Esq., I.C.S., Secretary to Government, Finance Department, United Provinces.

3. Sir William Stampe, KT., C.I.E., I.S.E., Chief Engineer, Public Works Department, Irrigation Branch, United Provinces.

4. Rai Bahadur Chhuttan Lal, I.S.E., Chief Engineer, Public Works Department, Roads and Buildings, United Provinces.

5. E. O. Shebbeare Esq., I.F.S., Chief Conservator of Forests, United Provinces.

6. Col. H. C. Buckley, I.M.S., Inspector General of Civil Hospitals, United Provinces.

7. Vishnu Sahay, Esq., I.C.S., Registrar, Co-operative Societies, United Provinces.

8. Dr. K. L. Chaudhri, O.B.E., M.B., B.S., Director of Public Health, United Provinces.

9. J. H. Ritchie, Esq., I.A.S., Director of Agriculture, United Provinces.

10. R. T. Shivdasani, Esq., I.C.S., Director of Industries, United Provinces.

11. C. S. Venktachar, Esq., I.C.S., Rural Development Officer, United Provinces.

CAWNPORE

12. J. G. Ryan, Esq., Secretary, Upper India Chamber of Commerce, Cawnpore.

13. Representative, United Provinces Chamber of Commerce, Cawnpore.

14. Dr. H. D. Sen, Assistant Research Chemist, H. B. Technological Institute, Cawnpore.

15. Mr. Krishna Kumar Sharma, M.A., B.COM., Professor, S. D. College Nawabganj, Cawnpore.

AGRA

16. Seth Alladin Bahai, Leather Merchant, Agra.

17. Zahur-ul-Husain, Esq., Deputy Collector, Agra.

18. Triloki Nath, Esq., Sub-divisional Officer, Kiraoli and garh Tehsil, Agra.

19. Professor H. L. Puxley, M.A., Agra College, Agra.

PARTABGARH

20. S. C. Roy, Esq., Deputy Director of Agriculture, Partabgarh.

21. Rai Sahib B. Nanak Chand Kapoor, Advocate, Partabgarh.

22. Madho Prasad, Esq., Co-operative Inspector, Lucknow.

23. Munshi Mohammad Sharafat Ullah Khan, B.A., Deputy Collector, Partabgarh.

24. Mr. H. C. Chaturvedi, Deputy Collector, Partabgarh.

25. Wilayat Husain Cossar, Esq., M.I.M. and C.E., M.I.M.S. (San.) F.I.E., Second Agricultural Engineer to Government, United Provinces, in charge, Eastern Circle, Partabgarh.

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